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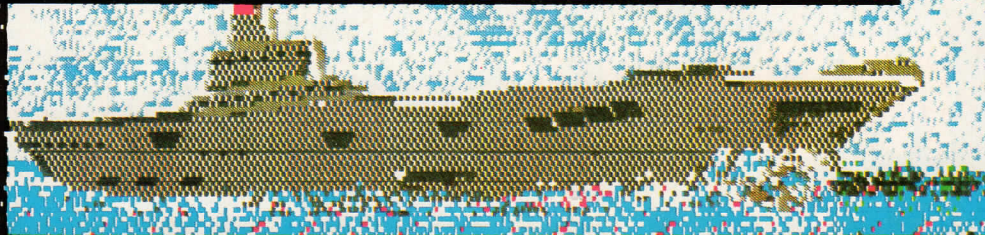
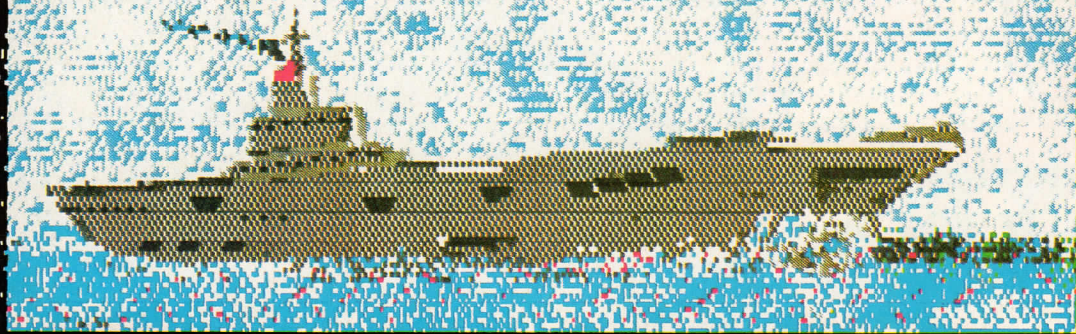
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to go for it**

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WARSHIP

FROM MASTER OF THE UNIVERSE SERIES



Designed by an ex MOD programmer, WARSHIP is a highly addictive military strategy game set in the first half of the 20th Century. Your aim is to defeat your opponent by evolving technology and taking over territory. As your technical excellence increases so does your strength. The game can be configured with a variety of modes and options to play against the computer, or with other players in a network. Features include: downloadable maps, fleet, and extension modules; 4-way scrolling 'hex-grid' map; Printer dump; 2-level map zoom; Free 2-user licence for 2 QL's; CDS-NET Network option.

The 'MASTER OF THE UNIVERSE' series is a family of games linked together to form the largest epic in the history of games. It will take you in stages from the dawn of man to the ultimate destination in time and space.

£14-95 Master-WARSHIP	(128K QL)	Including:
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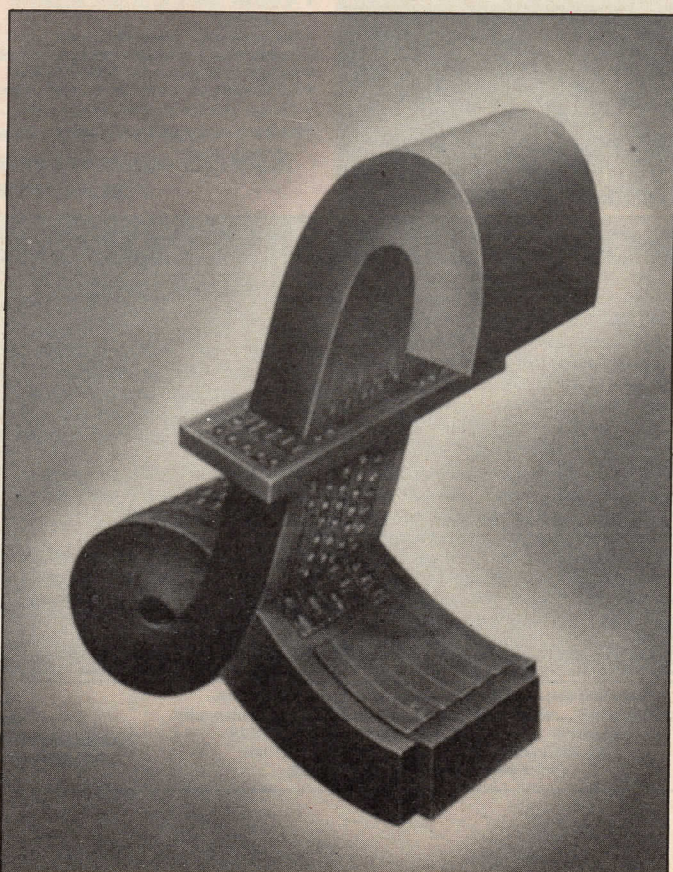
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NEXT MONTH

CP/M

Hallmark software claims its CP/M emulator for the QL will run any 'well behaving' CP/M program. Ron Massey will be finding out just what that means.

Do It Yourself

Seb Thomasini takes on the DIY Spot and provides a much requested Print using command.

Plus

James Lucy continues our business software survey. We also have a reader survey with the chance to win a free subscription.



TURBO V1.14

**THOR
COMPATIBLE**

"Dramatic . . . bug free . . . an excellent program . . . a great advance on Supercharge . . . more capable (than the latest version of QLiberator) . . . the fastest SuperBASIC compiler so far . . . mind-bending . . . takes SuperBASIC and the QL into a new era . . . With TURBO we should start to see programs which are unthinkable on any other small micro"

Upto 100X speedup on BASIC! QL WORLD, April 1987

- ★ Supremely fast – even QL World's independent benchmarks, which do not use TURBO's speed-optimisation options (which give a further 100% – 150% speed increase), show a 230% (yes – TWO HUNDRED AND THIRTY!) speed increase over the latest version of QLiberator. We can demonstrate speed improvements that are far greater, and the speed of compilation itself is typically 100% + more than on QLiberator.
- ★ Supremely concise – even QL World's size benchmarks, which do not use TURBO's size optimisation or diagnostics off options (which yield a further 40% saving in code space), show that TURBO generates more concise tasks than QLiberator!
- ★ Supremely compatible – TURBO compiles virtually anything you care to throw at it. Full auto-corrector built in, takes interpreter bugs in its stride, warns you if you've been too naughty.
- ★ Supremely easy to use – a beautiful front-end, on-screen help, instant abort, no LENSLOK, window adjustable during compilation, multitasks while compiling, adjustable buffer size/window copying/DATASPACE from front-window, user configurable to avoid boring keybashing, adjustable report file (to screen/printer/file etc.) in full or condensed format, etc.
- ★ Supremely flexible task communications – use PRINT and INPUT to communicate between any number of multitasking jobs – even arrays can be passed, and channels can be shared! Option strings can be passed as parameters of EXECUTE.
- ★ Supremely free from restrictions – you can use procedures or functions in any task from any other task! Generate tasks as large as the QL's 640K RAM – or go down the modular route (we supply a program to help you) and instantly link any number of modules.

★ Supremely Servile (!) – TURBO lets you choose between switching diagnostics on/off (off = shorter code), and between setting optimisation to global speed/localised speed (on a statement block basis) ★ size ★ size with localised speed ★ none, a total of 15 options. You are in the driving seat. If you slip up, we give you a report that pinpoints your mistake, exact to the character!

- ★ Supremely feature-filled: Virtual arrays, rubber arrays, implicit datatypes (accelerated, fully re-entrant integer FOR loops and integer/STRING SELECT on all QL s), full WHEN – ERROR trapping of any error on any QL version to a single point (error handlers – you can have any number of them, hierarchically laid out – have full access to line and error numbers, and you can RETRY or CONTINUE RESTART as you choose) even when in another task, parameter passing by reference as well as by value, 9 digits of displayed accuracy, etc.
- ★ Supremely powerful TOOLKIT included, with ONE HUNDRED AND EIGHTY (III) really useful commands, utilities and functions for the BASIC programmer. There is no space to even begin to list them – suffice it to say that TURBO TOOLKIT's most 'comprehensive' rival has little more than half as many features. The TOOLKIT (which is RAM based) is designed to complement existing toolkits (e.g. the Supertoolkit) as far as possible.
- ★ Supremely documented – a THREE HUNDRED AND FIFTY A4 PAGE, lucid, illustrated user encyclopedia.
- ★ Supremely generous – there are no royalty restrictions on TURBO'd programs.

The TURBO System costs £99.95 COMPLETE

TURBO IS BRILLIANT. PRESS COMMENT FROM EVERY SOURCE IDENTIFIES IT AS THE MOST OUTSTANDING BASIC COMPILER FOR ANY MICROCOMPUTER. THE TURBO TOOLKIT IS PERFECTLY USABLE AS A STAND-ALONE TOOLKIT, AND COSTS JUST £29.95. THIS amount will be credited if you subsequently purchase THE TURBO SYSTEM. "You are getting good value, and there is a lot more . . . TURBO TOOLKIT is a comprehensive product which will not leave you wondering where your money went – it offers a wide range of facilities to everyone (whether or not they own a compiler)!" . . . QL World, December 1986.

BETTER BASIC EXPERT SYSTEM

This does what its title implies, and its use is in analysing, correcting and annotating programs written in SuperBASIC or programs in other BASICs to be translated into SuperBASIC. BETTER BASIC is user-configurable and very easy to use.

"Excellent – a 5 star program" SINCLAIR USER, December 1986 **THOR COMPATIBLE**
"Intelligent – does well what it sets out to do" QL World, Jan. 1987

BETTER BASIC costs £24.95 complete with manual
£5 OFF if you are also ordering TURBO or SUPERCHARGE

★★★★★ GAMES ★★★★★

There is a misconception among those who don't own a DP game that because DP produces the best "serious" software, DP can't also be good at games. We strongly disagree!!

BLOCKLANDS £9.95 DP Classic 
"An addictive game . . . at twice the usual speed" QL WORLD

DROIDZONE £9.95
"mind-numbing" SINCLAIR USER
"For sheer blasting you would be hard pushed to beat DROIDZONE"

SUPER ARCADIA £9.95 QL WORLD
"We flipped over SUPER ARCADIA" HOME COMPUTING WEEKLY

SUPER REVERSI £9.95
Did you think Psion Chess was strong?

SUPER BACKGAMMON £12.95
"Brilliant" QL WORLD

Any 3 for £24, any 4 for £30, all 5 for £36!!

SUPERCHARGE V1.19

The old favourite – this acclaimed system automatically translates slow SuperBASIC into fast multitasking machine code. Ideal for those who do not need the full power of TURBO. "Superfast, Super compact and Super flexible – produces minor miracles – a superb utility – a 5 star program – a Sinclair User Classic (the highest award given to any program)" SINCLAIR USER
"The best professional applications package available . . . extremely impressive . . . the quality speaks for itself" POPULAR COMPUTING WEEKLY.

"The claimed speed increase over SuperBASIC was substantiated . . . QLiberator lacks Supercharge's finer features and is generally slow" . . . ZX COMPUTING.
"A runaway success – SUPERCHARGE is dangerously close to being a completely over-the-top raver . . . performance is simply dramatic . . . the final spark that sets the QL software scene alight . . . SUPERCHARGE really shows that you can do things on a QL that you can't on other machines"

YOUR SINCLAIR
"The claims made by DP are completely factual and in some cases understated. I was astonished with the speed . . . incredible . . . it really does what it says. The QL is at last forced to live up to its original specification" QUANTA
£49.95 with 110 page A4 Manual.

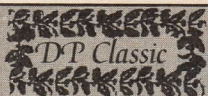
SUPER MEDIA MANAGER V1.12

An essential program for anyone who uses microcartridges and/or disks to store things of value! No more need you fear for the safety of your programs & data. Super Media Manager provides a host of device management tools in one integrated, fully menu-driven unit – an unbelievable 350K of programs!

- ★ Selective directory, copying, and erasing of files
- ★ Sector loading and viewing (cursor controlled)
- ★ Sector editing – Hex. and ASCII input allowed
- ★ Automatic reports when mapping sectors
- ★ Sector copying to sector, file, device, etc.
- ★ Viewing, printing, or saving of drive map details
- ★ Automatic (semi-auto on disks) recovery of deleted files
- ★ Bulk recovery of corrupt files to new files
- ★ Header block or Disk type information display
- ★ String searching by sector or file – ultrafast
- ★ Full directory sort facility, by name/size/type/date etc.
- ★ Control upto 256 separate cartridges/disks – DIRECTORY OF DIRECTORIES
- ★ Direct file copying from other disk formats (PC-DOS, MS-DOS, CP/M, Acorn DFS etc. etc.) – sector copying to other disk formats.
- ★ Text file translation utility – expands tabs, converts CR/LF to LF intelligently; converted files may be imported to Quill.
- ★ Disk sector editing for both QL & non-QL disks, with all the usual features
- ★ Full error reporting with automatic recovery
- ★ Hexadecimal calculator
- ★ System configuration

THOR COMPATIBLE
"SMM has every possible facility . . . it's got to be a world beater" QL WORLD, November 1986

£39.95 COMPLETE WITH 98 A4 PAGE MANUAL OR £24.95 FOR A CARTRIDGE ONLY VERSION



PROFESSIONAL ASTROLOGER V1.5

**THOR
COMPATIBLE**

NEW FASTER VERSION (TURBOCHARGED)

- ★ Amazing Astrology system ★ Supplied with 140 A4 page Manual which assumes no knowledge of astrology ★ Gives 10 A4 pages of personality/character delineation ★ Gives 6 A4 pages of day-to-day and year-to-year personalised text predictions ★ Gives 3 A4 pages of text comparisons between two people ★ Massive 300K of user adjustable text files (450K for disk users) supplied together with machine code editor ★ Incredibly fast – 0.5 seconds/computation ★ One minute accuracy this century ★ Exact hardcopy on all options – 16 print modes, user definable astrological glyphs and printer driver ★

"One-of-a-kind . . . every requirement provided for . . . descriptions such as superb, ultimate, excellent are barely adequate" QL World
"The most powerful & complete astrology package on any micro . . . provides everything that a present day Nostradamus will need . . . the ultimate astrology package . . . a 5-star (★★★★★) program – a Sinclair User Classic (the highest award given to any program)" SINCLAIR USER.

"The best Astrology program of them all" PREDICTION Europe's leading astrological magazine.
"Fascinating . . . unrivalled accuracy . . . excellent value . . . the most comprehensive astrology program ever produced" LIVERPOOL ECHO.
PROFESSIONAL ASTRONOMER is £10 extra for users of Professional Astrologer. ASTRONOMER has a full planetarium display, a choice of 5 coordinate systems. Moon/Mercury/Venus/Mars actual face display with real shadows and eclipses, automatic parallax correction (only NASA has this!), solar system display in parallel projection with zoom, tilt, freeze, autoincrement, etc. If not bought at the same time as Astrologer, the price is £12.95.

£59.95 Complete with huge manual, or £69.95 with Astronomer

- ★ Transits ★ Progressions ★ Synastry ★ Choice of 7 house systems ★ Individually adjustable orbs ★ Batch processing mode ★ Full Quill compatibility ★ 158 birth data files supplied ★ File compression ★ Output to any device, including files ★ Advanced command language using AND/OR/NOT and a PO123456789 multiple criteria facility ★ Eclipses ★ Closing aspect indicator ★ Comprehensive user tunable defaults ★ Rectification ★ Extremely user friendly ★ Real-time interpretation trim

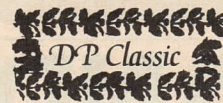
SUPER ASTROLOGER £24.95

"Incredibly fast . . . unnervingly accurate even on default files . . . a powerful tool . . . easily the best & most powerful astrology program for any micro . . . I would strongly recommend it" QUANTA
"An invaluable tool – an excellent package – a 5 star (★★★★★) program" SINCLAIR USER

A fun-filled package for beginners – ideal for parties, friends, entertainment.
"Succeeds very well . . . an excellent program . . . you certainly will not find as good an astrology program as this on any other home computer" QL USER/QL WORLD



DIGITAL PRECISION DESKTOP PUBLISHER



**THOR
COMPATIBLE**

A Full Function Machine Code Desk Top Publishing System! No more need to suffer constant file updating, primitive graphics, achingly slow screen updating, occasional lockouts... DESKTOP PUBLISHER's specification, speed and performance equals or exceeds those of packages costing hundreds or thousands of pounds. Total user control ★ Fully WYSIWYG (What You See Is What You Get) ★ Extreme user friendliness ★ 12 integral graphic fonts ★ 8 integral QL text fonts ★ 150 integral graphic symbols ★ 160 integral paint brush shapes ★ 10 non-integral fonts supplied ★ decorative fonts ★ All fonts can be adjusted both horizontally and vertically ★ Borders and margins generated from a graphics menu ★ all proportions redefined pixel by pixel ★ centre and true descender editing of characters ★ merging with AND-OR-XOR ★ whole and partial inversion ★ mirror imaging ★ Switchable grid ★ separately adjustable X & Y axis magnification and reduction ★ upto ×15 zoom ★ Stipples ★ Stripes ★ rotation ★ importing of text and non-text documents from the Editor ★ Importing of text documents from any word processor (even Quill!) ★ Importing of screens/part screens/compressed screens/part-colour screens from EYE-Q, the finest graphic package available ★ Importing of full screens saved by any graphics package ★ Freehand drawing of screens with restriction free mixing/overlapping/combining of text and pictures ★ Full cut and paste facility ★ selective save ★ hierarchical escape-undo function - you will not lose things accidentally ★ 960 × 800 pixel drawing area (×2 if you have a fully expanded

QL, and cut/copy/paste over 2 pages) ★ 80×160 lines×columns ★ full device independence ★ Epson-compatible hard-copy output in either A4 or foolscap ★ Upright or sideways printing facility built in ★ UDGs on (8×8) (16×16) ★ Full-feature integral font editor ★ Full-feature integral graphics generator ★ Left, right and centre justification - **PIXEL BY PIXEL (!)** ★ Bold & italics left & italics right ★ pixel by pixel or character by character movement ★ perfectly usable with a cartridge-only system ★ 4 different cursors ★ 4 different underline styles (single/double/plain/stipple) ★ Cursor-dragged, user-definable boxes ★ columns to any width (multiple justifications allowed!) ★ Variable line feeds ★ fully menu driven ★ Screen pans and scrolls ★ Window pans and scrolls ★ Text/picture within window pans and scrolls ★ Direct entry of text with full range of editing & movement commands ★ clip art ★ caps lock indicator ★ Horizontal & vertical rulers ★ Full status reports on-screen ★ help facility ★ Single key stroke commands ★ Extremely - even unbelievably - fast ★ Reconfigurable printer driver ★ multiple pass printing (up to 5 passes) ★ PAR + SER Printers ★ Alteration by block + line + word + character + pixel ★ Check question before any drastic action ★ Large & Lucid A4 illustrated manual - with an index ★ Needs at least 256K expansion RAM (DP will supply a full 640K expander (external, with plug through connector) for £109.95) ★ Easy creation of A5/A4 booklets, cards, letterheads, posters, bulletins, newsheets, newsletters - even newspapers or magazines.

DESK TOP PUBLISHER COSTS £69.95

While Desktop Publisher is a stand-alone program, to get the very ultimate in flexibility we recommend:

DESK TOP PUBLISHER + EYE-Q COSTS £94.95

DESK TOP PUBLISHER + THE EDITOR SPECIAL EDITION COSTS £104.95

DELUXE DESK TOP PUBLISHER (including EYE-Q + SPECIAL EDITOR) COSTS £124.95

THE EDITOR v1.15/v1.16 SPECIAL

"Superb... it exceeds feature specifications found in even the best word processors presently available... natively multitasking... you will actually look forward to using Editor (this never happened with Quill!)... you are in complete control... seldom have I ever come across a program which positively scintillates with such due care and attention"... QL World, January 1987.

The Editor is amazing - a few of its features are summarized below:
★ Speed improvements of the latest edition of the EDITOR over Quill are simply ridiculously good - load-time improvements of 25 times, block-handling improvements of over 100 times, deletion improvements of 50 times, searching improvements of 100 times.

pagging improvements of 100 times, copying improvements of over 1000 times, etc...

★ Flexible - Editor can load and handle text, Quill documents, SuperBASIC programs, listings in assembler or high level languages, QL screens, data files, machine code object files, alien format files caught by Media Manager, even Editor itself (!) - and you choose your own fonts too.

★ Feature-packed - an independent count of features yielded QUILL 14, METACOMCO ED 17, EDITOR 65 (!) (Ask DP for a factsheet if you are a sceptic!)

★ Here's a mind blowing option - Editor allows you to create

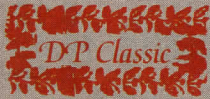
command files (using ANY/ALL of the 102(!) commands) for subsequent execution. In the SPECIAL EDITION, these command files can have up to nine parameters each... pause & think what can hence be accomplished!

★ Friendly - with full on-screen help and a very flexible configurator giving you access to everything (screen shape, size, position, three ink colours, three paper colours - even the characters to act as delimiters for word searching or replacing!).

★ Now with a new all-singing, all-dancing printer driver - lets you start where most Editors stop!

★ Lucidly documented - new larger manual.

There are two versions of EDITOR - one that will work on any QL, and a SPECIAL EDITION with dozens of additional features but which needs at least a 128K RAM expansion



EDITOR costs £29.95

SPECIAL EDITION EDITOR costs £39.95 complete

**THOR
COMPATIBLE**

EYE-Q V2.0 The Definitive QL Graphics/CAD System

Fully driven by pop-up menus ★ single key entry ★ several zooms ★ windowing ★ proportional movement ★ paint/fill ★ rubber bands ★ arcs ★ ellipses ★ circles ★ lines ★ files ★ replicable sprites ★ horizontal & vertical stretch ★ reflect ★ invert ★ transfer ★ pan/scroll ★ undo (ie; whoops!) ★ font design editor ★ automatic anti-aliasing ★ graphic screen compression ★ offset display ★ on-screen help ★ XOR/OR cursor with variable width ★ paste ★ recolour ★ magnify ★ reduce ★ text inclusion ★ freehand movement ★ localised save/load/scroll/pan/recolour/zoom ★ Integral character editor ★ full range of QDOS colours & stipples available through paintbox ★ user-definable defaults ★ 2 fonts supplied ★ amazing 4 colour airbrush ★ user definable printer driver (user sets proportionality, graphic mode, density etc) - hundreds of printers supported ★ improved fill and compress ★ 3 text modes plus toggle off ★ rubber band boxes and own screens ★ full compatibility with SUPERCHARGE, TURBO, SSG V4.0, joysticks + TURBO TOOLKIT ★ monochrome save ★ localised options on all full-screen operations ★ user switchable resolution ★ SuperBASIC extensions supplied free

Two artistic but provocative demo screens supplied - prudes stay clear!

"Includes every conceivable drawing option... is simple to use... a powerful CAD system of monumental proportions... outstanding... a brilliant concept, highly innovative... accuracy is superb... very well produced, incorporating the best features of other graphic programs... very original, useful, highly-innovative functions..." QL WORLD

"Digital Precision is right, this is the definitive QL art package - go out and get it. This program wins, no problem!" SINCLAIR USER

"Up to now, the last word in graphics packages for the QL has been from Talent. EYE-Q has more features, is considerably easier to use, and is also about half the price!"

POPULAR COMPUTING WEEKLY



EYE-Q costs £29.95 complete with lucid A4 documentation

EYE-Q is fully compatible with DP's new DESKTOP PUBLISHER

The GIGA mouse version of EYE-Q costs £34.95

**THOR
COMPATIBLE**

SUPER SPRITE GENERATOR VERSION 4.0 DE LUXE

Superb games designer in its final form. New manual, upto 256 multicoloured sprites, upto 256 planes, upto 16 frames each, windows with screen 1 and 2, 100% flicker free, individually variable speeds, hundreds of special effects. Works with keywords from SuperBASIC or machine code (new faster integer keywords supplied) - easily compiled with SUPERCHARGE or TURBO.

"A well-designed & carefully planned utility - invaluable - simply excellent" QL USER.

"The sprites produced are very good" POPULAR COMPUTING WEEKLY

"Excellent" THE U.S. QL REPORT

"The results that can be achieved are excellent" ELECTRONICS & COMPUTING

Most QL games on the market are written using Super Sprite Generator... now you can get the same effects!

£29.95 COMPLETE, OR £24.95 IF BOUGHT WITH EYE-Q

TERMS & CONDITIONS

- UK delivery costs are all-inclusive. Europe add 5%, elsewhere 10% to cover airmail costs.
- Program upgrades can be obtained by sending us the original cartridge (NOT the packaging or documentation) plus £10 (£12 Europe, £15 elsewhere).
- SUMMER BONUS - £1 off if you buy 2 programs, £2 off on 3, £3 off on 4, etc.
- A deluxe stand-alone keyboard is available for £89.95 (it has numeric and cursor keypads) - or just £174.95 if bought together with TURBO. Or get TURBO + ICE £119.95 - or £129.95 including CHOICE.
- The GigaMOUSE system and the GigaSOUND system cost £89.95 each - 10% discount if bought with any DP program.

SUPERFORTH V2.0

The full multitasking, stand-alone, high speed FORTH-83 system is now supplied with an extremely powerful compiled Othello (beat the 1983 World Champion program from MOI!). This latest version has new, extended documentation and full string handling. Now fully compatible with 68000 code & QDOS.

"Succeeds very well" QL WORLD

"The Definitive FORTH... excellent... very fast..."

user-friendly... the best" QUANTA

SUPERFORTH costs £39.95 complete with 100 page A4 manual

Coming soon
MASTER BRIDGE PLAYER

DIGITAL PRECISION

To: DP, 222 THE AVENUE, LONDON E4 9SE (Or use the Credit Card Hotline 01-527 5493)

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for the amount of £..... Number Expiry date

Please indicate if you have 3½" disks 5¼" disks Microdrives only

If you have disks, do you get 720 sectors 1440 Sectors

Signature



SANDY QL SPECIALS

—NEW PRODUCTS—

SUPERMOUSE FOR SUPERBOARDS — factory fitted upgrade provides high quality mouse with full pointer/real windowing/multi-tasking front end plus QRAM UTILITIES from QJUMP and CADPAK graphics program.

SUPERDISK — 3.5"/5.25" disk interface & parallel printer port with RAMDISKS, disk management utilities: compatible with all memory expansions/ROMs — tremendous value!

QROM — the ultimate QL ROM disassembly fully explained with notes and examples — essential reading for every serious enthusiast.

SPECIAL MAY OFFER
SINGLE DISK DRIVE AND
SUPERDISC INTERFACE 180.00

—HARDWARE—

SINCLAIR QL 128K	120.00	IBM STYLE KEYBOARD/INTERFACE	130.00
SINCLAIR QL 640K	199.00	QEP 111 EPROM PROGRAMMER	115.00
THRU-CON RAM CARD 512K	96.00	QEP EPROM CARTRIDGE	5.99
SUPERDISK INTERFACE	85.00	10 VERBATIM 3.5" DSDD DISKS	24.00
SUPERQBOARD		MICRODRIVE PACK OF 4	6.99
0K RAM	110.00	NEW MICRODRIVE CART LOOSE/10	16.65
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QL Invoicer is designed to save business users both time and money. It will produce smart invoices and statements on plain A4 or standard computer listing paper, using Epson-compatible serial printers.

You can enter up to 10 items, each individually priced, per invoice and the

program calculates the sub-total, VAT if applicable, and the final amount. It will store the names and addresses of up to 100 customers, so that you will have to type them in only once. There is also a wildcard facility to deal with one-off transactions. You can print multiple copies of a document and the data is

posted automatically to your customer's account.

QL Invoicer can be used on its own, or it can be integrated with the QL Small Traders Pack. It contains a sales ledger routine, so that data can be exported between the various modules. Statements are compiled automatically directly from the sales data file. The printed documents can also include two user-defined footers — for such information as payment terms and VAT registration numbers.

This package is complete with mini-calculator, clone and file utilities — all linked by an easy-to-use Master Menu. It costs £14.95, including A4 manual and U.K. postage. There is a special price of £9.95 for purchasers of the QL Small Traders Pack. Add £1 post/packing overseas.

Further details from SD Microsystems, PO Box 24, Hitchin, Herts.

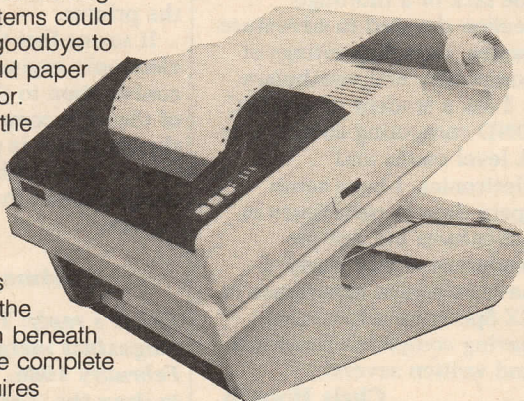
Stand firm

Described as 'the design revolution that makes other stands obsolete' the Micromaster from Strong Computer Systems could mean saying goodbye to reams of fanfold paper all over the floor.

Apparently, the major advantage is in the positioning of the paper storage and collection trays — one above the other and both beneath the printer. The complete assembly requires

virtually no more space than the printer.

The Micromaster 80 for 80-column printers costs £59 and is available from Strong Computer Systems, Bryn Cottage, Peniel, Carmarthen, Dyfed SA32 7DJ. Tel: 0276 231246.



Chip Board nears completion

Developments are progressing well for the QFlash Chip Board, sold in the U.K. exclusively by TK Computerware, and first reported in *QL World* last month. The very early wire-wrapped prototype included four sockets for use with 16K EPROMs on a PCB with through-connectors for interfacing with the QL between the expansion port and disc interface, when fitted.

While still in the prototype stage, the current version has two EPROM sockets which are switchable for either two 16K, 32K or 64K EPROMs. The system, however, does not allow a mixture of EPROM types to be used, because of differing addressing

requirements. Nearing its release date, the final version of Chip Board will have three hardware-switchable EPROM sockets for the range of EPROM configurations and will support 192K of on-line software.

Users have the option of connecting up to two Chip Board systems together, without a disc I/F, to provide up to 256K of EPROM space, in addition to the ROM port on the back of the QL.

Negotiations are proceeding with many major software houses to arrange licensing for the more popular programs to be transferred to EPROM, allowing users to dedicate their QLs according to particular applications.

Dedicated CAD

DataCAD QL is the name of the debut product from yet another company to enter the QL software market, Datakey Developments. The program can produce PCB designs, 2D and 3D drawings, or can be used for page layout. Large fonts can be created and used to label drawings or create pages of text — one obvious application is poster design.

The package is designed specifically for output to a plotter. The current version supports the Silver Reed EB50 but can be configured for most popular plotters.

The software costs £9.50 and the Silver Reed plotter £175. Together with a QL at £100, a complete CAD system can be had for less than £300. More information from Datakey Developments, 15 Lacey Green, Balderton, Newark, Notts.

A super Q worth joining?

Continuing improvements have resulted in a new release of the Sandy Super Q Board. With a chip-packing density which has to be seen to be believed, the top-of-the-range new Super Q now has its own integral mouse port as well.

The most important improvement to the disc I/F is the version 1.18Y disc driver software which provides a much-reduced access time for later versions of disc drive. Aimed primarily at newer drive systems such as NEC or Sandy Panasonic drives, users with older and/or slower drives will have to perform a simple software alteration of the start-up-time parameter to ensure the data integrity of their systems.

Other standard Super Q features include an improved Tebby Super Toolkit II. The Futura, arriving in pieces, will include a version of the mouse I/F built into Super Q. Utilising the same two-button mouse supplied by ABC, software such as the QRAM utilities operates in a very impressive manner.

Although a very useful, well-thought-out add-on, there are now four mouse systems available for the QL, none of which so far has provided more than a minimal number of programs with which to use them. Needless to say, the situation tends to make potential purchasers wary of committing what can quickly become a substantial investment.

One only hopes that the linking code used by the exceptionally good design of the Sandy mouse system will become readily available, and easily adaptable, for other software houses interested in taking advantage of incorporating mouse facilities in their programs, commercial or otherwise.

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, Greencoat House, Francis Street, London SW1P 1DG.

OPEN

Standing up for Swopper

I am very pleased with the majority of the coverage of our products in the January 1987 *QL World*, which included some editorial about taking on the Computer One QL products and reviews of *Swopper* and our Microdrive toolkits.

Unfortunately, although most of the comments about *Swopper*, our task-swapping program, were fair and accurate, there were two factual errors, one of which was very damaging. I also felt a little more could have been done to show that there was, in general, a choice between the power and sophistication of *Swopper* and the ease of use of, say, *Taskmaster*.

The most important error was in the concluding paragraph which states: "The major disadvantage with *Swopper* and *Choice* is that they do not truly multi-task". *Swopper* allows you to multi-task. When you move from one job to another, the control key is used to indicate whether the job you leave is to be suspended or not.

The second error is in the middle column of page 22 and implies that there is a bug in the replacement version of the "respr" command. This appears to be a typographical error and I assume should have read "... and 'respr', which replaces the original command which does not work when a job is running". The article omitted the second 'which'.

The general points which could have been made were that although there were other easier-to-learn packages, *Swopper* enables greater automation, through loading of default files and the like, does not require additional RAM to be useful, and provides example programs to show you how to make the most of it.

The point was made that

Taskmaster required at least 256K of RAM to be useful with the Psion packages but not that *Swopper* will let you swap between Basic and any one of Quill, Abacus, Archive or Easel on a bog standard 128K QL. If you have RAM extension, *Swopper* can still fit more jobs into the QL because of its compactness.

On a different subject, readers may like to know that Computer One Ltd has gone into liquidation, only a few months after we took over its range of QL software and the events are totally unconnected.

Mark Hughes,
Compware,
Crewe.

Key question

I read with interest the March article on QL keyboards. Why have the manufacturers adopted the same approach to installing these keyboards, that of disconnecting the QL keyboard? Why not produce a keyboard membrane containing a set of keys which could be fitted over the existing QL keyboard, yet still use the resident keyboard's strokes, thus avoiding the need for opening the QL and inserting a new cable? Surely this would be a cheaper and better alternative for the user.

Richard Collins,
Cork, Republic of Ireland.

Editor's reply: Cheaper perhaps, but such an arrangement would undoubtedly be somewhat Heath-Robinson — an image from which QL hardware is rightly moving away.

Not all manufacturers have adopted the same approach. The Ultrasoft keyboard uses a replacement membrane but has the original QL key caps.

Engineer's complaint

The February edition omitted *QL User* on the cover but the contents page was as usual. In the March issue *User* was omitted, Where has *QL User* gone?

As a retired electrical engineer I still use a slide rule because commonly-used constants do not appear on pocket calculators, nor are they included on microcomputers. To add insult to injury, no magazine

has any really effective section devoted to engineers' programs.

I have long considered games as being for babes at the breast, infants in arms and children under the age of 10. They can acquire some bad habits in computer operation and I have several times pointed this out with virtually no response.

The QL has a scale key but this is linear and is X/Y same scale. The most commonly-used electrical scale is log/log with the X decade twice the Y decade. It is, of course, possible to write a program for this and turn it through 90 degrees to the printer.

It seems that the electrical/electronic engineer whose contribution to the creation of the vital components of the computer is poorly served by both hardware designers and the magazine editors.

John Hall,
Sidmouth, Devon.

Editor's reply: The two magazines merged in February 1986. We decided to drop the 'User' for the sake of brevity but the magazine will remain essentially the same. The content — we hope — reflects feedback from readers.

Adventurous

May I say how much I enjoy reading your magazine each month? My one criticism is the lack of a thorough section devoted to adventure games, including ratings of complexity and vocabulary.

I am a student on a BTEC OND computing course plus A level maths and electronics. I have some spare time to participate in adventures but not the resources to buy many. I have extensive experience of ZX-Spectrum adventures, having completed hundreds and written several.

Chris Hopkin,
Eastwood, Notts.

Editor's reply: We receive very little feedback on adventure games. Is anyone interested?

The right wavelength

I am a radio ham and have been interested in radio for several years. E. A. Duncan-Dunlop asks what is a radio rally?

Radio rallies are held round the country, about two or three a month. The rally consists of traders selling all types of radio equipment and as computers are very useful to radio hams, it is usual to find plenty of computer equipment for sale at good prices. Also on sale are new components for home

construction. A word of warning to future rally visitors. A large percentage of what is on sale is for constructors and experimenters. Equipment purchased might require research and modification to suit one's particular needs.

For more information on rallies contact Radio Society of Great Britain, Lambda House, Cranbourne House, Potters Bar, Herts EN6 3JE. Tel: 0707 59015.

M. J. Musgrave,
Laindon, Essex

CHANNEL

Skyburst tip

Having failed to progress beyond the third attack wave in the fiendishly difficult *Skyburst* published in the February issue, I examined the listing with a view to tinkering, hoping to obtain more lives than the pitifully inadequate three which the author provided.

Those who wish to enjoy the superb graphics of the later waves may like to amend line 3060; if the 3 is replaced by any higher number, up to 255, a corresponding number of lives will result; the checksum figure at the end of this line should also be increased accordingly.

**Dhyan Vijen,
Swindon.**

In search of a screen dump

I wonder how many of your readers are bothered, as I am, with less than satisfactory screen dumps? I have struggled with several of your suggestions, published in the last year or so, without obtaining complete satisfaction. The nearest I got to my heart's desire was in using the adaptation of the Easel dump but, unfortunately, it cut off a few characters from the left-hand side and produced considerable change in the aspect ratio which was particularly noticeable in the reproduction of a circle.

Earlier this year I bought, through a retailer advertising in *QL World*, an MCS Memodisk and the matching

Utilities Software ROM cartridge. One of the factors which influenced me in making this particular choice was the description of the screen dump facility. It is claimed that it is "probably the most advanced screen dump for the Sinclair QL — it produces a full-sized printout". You can imagine my consternation when all I could get was a postcard-size reproduction of a whole-screen picture.

It may well be that there is a method of obtaining a near to 1:1 reproduction by use of a particular routine, familiar, no doubt, to experienced programmers and users, but why does MSC not include it in its

instruction booklet for the sake of beginners?

Can you also help in drawing the attention of manufacturers to the general lack of clear, comprehensive instructions and information on products for the QL? I would commend to them the Users' Manual for the Star SG-10/15 printer, which is by far the best publication of its kind that I have encountered.

**David Downie,
Glasgow.**

Finding a quicksort

The Qsort procedure in the January, 1987 issue by Mike Lloyd was welcome. An additional line in listing four would show what happens, without February additions. Line 477 — AT 10,10: PRINT lo TO 20; PRINT hi: PAUSE 25. Times for a 100-line, simple integer array were 41 seconds with line 477 added and 21 seconds without — the PAUSE command being omitted, of course.

The quicksort by Marcus Jeffery in the issue of August, 1985 is twice as fast — 23 seconds if k and j are printed to the screen at lines 2260 and 2300 or a mere 11 seconds if not, though that one requires a blank array line at the end.

If one quicksort can be twice as fast as another, surely someone can produce others even faster. Please, you computer wizards, even 10-20 percent time reduction is a boon with a 5,000-plus array to sort.

If you want to know how long a quicksort will take for very long arrays, run a test on a 100-line array, first printing s=date at the beginning and t=date at the end and then t-s to get the

time. Then try the following short program:

```
100 REPEAT loop
110 INPUT $0, 'Array size'
    !n/'Factor'!f
120 PRINT n*LOG10(n)/
    LOG10(2)/f; 'secs'
130 END REPEAT loop
```

Run the short program with n=100 and f=50. Keep altering f until the answer equals the time taken for your 100-line test. Then make n as big as you want, to find the time for your large array. It will not be absolutely accurate.

**Don Smith,
Kirkbymoorside,
York.**

Bridge, anyone?

I wonder if anyone has written or knows of a duplicate bridge scoring program for the QL?

**P John,
214 High Street,
Cambridge CB4 4RZ.**

Editor's reply:
Can any bridge players oblige?

Organiser

I have bought the Psion Organiser II XP model but I am not able to transfer any files from the Organiser to Archive.

There are no problems to send files from Archive to the Organiser. Do you see any explanation? I have bought the Textbase software from Eidersoft but it makes no difference.

**Jürgen Mendel,
Orleans-La Source,
France.**

Editor's reply: You should be able to transfer files from the Organiser directly into archive using Textbase. Full instructions are given in the Textbase manual.

Make sure you have correctly set the parameters from the 'setup' manual.

Open the file you want to send and choose two export options from Textbase, press A to send the file and import to Archive with the command import "serzhz" [ENTER] as "filename" [ENTER].



No entry?

While the QL Gold scheme may be a good idea, I feel that it will restrict the access of non-cardholders to the Technical Helpline, Open Channel and Troubleshooter. Only a limited amount of magazine space and time are available and if cardholders have greater access, the availability of those services to non-cardholders will necessarily be reduced. I hope that a portion, perhaps 40 percent of the available resources, will be devoted to non-cardholders to prevent them being squeezed out.

**Ian Jackson,
Pocklington, York.**

Editor's reply: Do not worry. Non-cardholders will not be ignored — though there are other, better reasons for applying than priority access. Besides which we try to solve problems which will be of interest to everyone.



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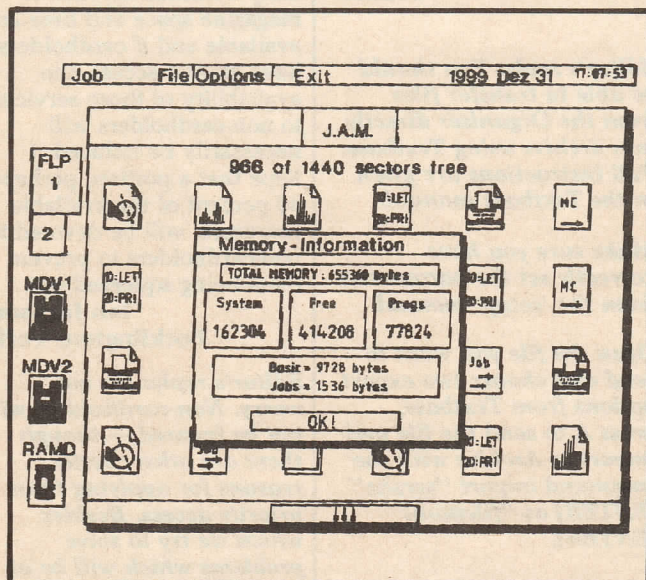
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GRAPHICS CONSTRUCTION KIT

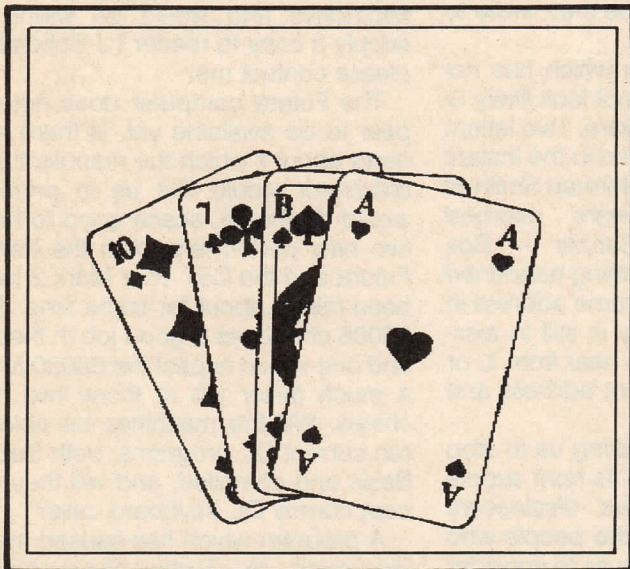
Now you can write your own customised graphics program in minutes, i.e. a package like EYE-Q (copyright Digital Precision) should be possible with about 8 KB of Basic, which can be compiled if necessary.

A set of Superbasic extensions that really allow you to design a program that suits your needs and not to suit your needs to the program. Comes with a free demonstration program and a comprehensive user handbook. DM49.90 £14.95

FULL HOUSE

Reviewed in QL World 11/86: '... it is good fun to play, worryingly addictive ...'

100%. Machine code. Superb colour graphics. You need nerves of steel to play. A fruit machine poker game completely identical to many machines found in German pubs. DM39.90 £12.95



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— the KEYBOARD conversion for the QL. IT has been available since the 27.01.87. Need we say any more. DM169.00 £49.99

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TROUBLE

Troubleshooting Bryan Davies has prompted a strong response from dealers keen to uphold their good reputation. There are others, however, who seem to have disappeared without trace. Read on, and be warned!

There have been some calls and letters from suppliers who are worried that effectively we are embarking on a quest to destroy reputations by not first checking our information. That would not benefit the magazine, obviously, and it is not our intention. We hope to do three things in particular — warn readers of companies which do not provide good service, prompt companies in cases where it appears that complaints have not been dealt with, and help reduce the number of incompatibility problems between various hardware/software items. The strong response received from some suppliers indicates that they are keen to protect their reputations but I have had no response from five of the 14 suppliers contacted so far.

Letters of complaint from six readers were sent to the suppliers concerned in the middle of February. All but two produced replies in a few days. One supplier was concerned with both of the outstanding letters and letters from seven more readers — and another from one of the earlier two readers — were sent to the same company in mid-March; there has been no response to them either.

I called 4 Systems twice on 01-844 1399, as given in our Instant Access list, and talked to an answerphone. The message on that did not give any company name and the messages I

left did not produce any return call. British Telecom advised me that it had no number listed for 4 Systems. If the company is still active, perhaps the principals would consider writing to *QL World* and giving details of what has been done to deal with the complaints of Messrs. Barraclough, Dougan, Cappellozza, Dufton, Kuehn, Muskett, M. Smith, Terrez and Ulijn.

Pause for thought

Readers recognising their names in this list might write to me to indicate whether or not they have been contacted by a 4 Systems since they wrote to *QL World* to complain.

One other company which has not responded, and does not look likely to do so, is Portfolio Software. Two letters sent to the address given in the Instant Access list by reader Norman Smith of Reepham, Norfolk were returned marked "Return to Sender — Box Cancelled". The same thing happened to a letter I sent to the same address in March. If the company is still in existence, we would like to hear from it, or anyone else, the current address and telephone number.

We receive letters asking us to stop accepting advertisements from suppliers which incur readers' displeasure and we must ask that the people who make such requests pause to consider what they are saying. While they do no doubt feel they are aggrieved, it is usually a question of one person's word against that of another. If there is sufficient evidence to suggest that a particular supplier is failing regularly to meet advertised claims, action can be taken, but it takes a long time before such action is justifiable.

Not all satisfactory

You will often see in magazines and newspapers advertisements from The Advertising Standards Authority, the body to which complaints should be addressed, as its sole job is dealing with them. So far, the response I receive to queries is good and there are signs that the real problem companies in this business will not be difficult to identify. They will be the ones which fail repeatedly to reply to letters asking for comments on readers' complaints. If

we cannot obtain replies, we will say so.

Getting a reply from a supplier does not mean the complaint automatically was dealt with to the reader's satisfaction. The answers given to three of the four readers in the initial batch were satisfactory but the fourth was not. That was a request for information on how to obtain a copy of the Quest International disc drive operating system; Quest has left the QL scene and the company to which it passed the request does not deal with the QL. If anyone has the operating system on Microdrive and would be willing to supply a copy to reader I J Bottomley, please contact me.

The Futura computer does not appear to be available yet. Is there any news about it which the manufacturer/distributor would like us to print? It would do the QL scene good to have two new performers; both the Sandy Futura and the CST Thor Mark 2 have been talked about for some time. The 68008 chip does a good job in the QL and one would expect the 68020 to do a much faster job in those two machines. Will the machines be able to run current QL programs, both Super-Basic and compiled, and will they accept normal QL keyboard calls?

A program which has caused much discussion is *Turbo Supercharge*. That, too, was announced some time before it was delivered. There were problems associated with its production which were not foreseen. A version of the program was ready before Christmas — the associated Toolkit was being supplied before then — but it was decided to hold it back until extensive further development had been done.

By all accounts, the product now being delivered is something special and was worth the wait. Sales have been good, despite the high — for the QL — price; a comparable product for a PC-compatible would cost several times as much and not supply so many features. There are Turbo versions for both standard and expanded QLs, so make sure you specify which you need.

Digital Precision seems to have an answerphone in use much of the time

SHOOTER

E M S O L V E D

and I asked managing director Freddy Vachha to comment on the policy for dealing with calls. He stated that all incoming calls received by answerphone are logged and DP makes up to four attempts to contact the callers subsequently, to deal with enquiries. That calls are not always dealt with personally initially is no surprise; it is in the nature of the small computer scene that calls tend to be long and all the DP lines would be blocked frequently to deal with very few callers.

Research needed

Since most calls require some research before being answered fully, time is saved by taking a message first, then calling back with the required information. There was a period during the middle of February when DP response may have seemed slow — the company closed for two weeks for a long-overdue holiday. British Telecom did not help by putting all the telephones out of action at one period during the recent industrial dispute, the effects of which are still being felt.

Eidersoft expects to move to new, purpose-designed offices in the middle of the year and that should enable it to give faster response. It plans to use linked terminals for faster access to its databases. Mail order does not always suggest good service to some people and it certainly causes plenty of trouble to suppliers. Eidersoft points out that failure of customers to provide a full name and address causes much trouble; those who pay through money-transfer — e.g., international postal orders, National Giro — should make sure to associate the payment with an order letter or telephone call reference.

There is nothing much a supplier can do when money arrives and it is not stated for which order it is. You may not be familiar with Post Office practice concerning delivery of parcels; from my experience if I do not get to the door within about 10 seconds of the postman knocking it, he has gone. The parcel may have been left somewhere outside the house — on the doorstep, with a neighbour — or it may have gone back to the Post Office. It seems surprising but people do not always collect such parcels and the

suppliers then receive them back. Such experiences seem to be commonly associated with orders from outside the U.K., because there are more links in the chain and some Post Offices are not absolutely efficient. The supplier may be spending plenty of time and money trying to fulfil your order but getting nowhere because of missing information and delays en route.

Good news on the incompatibility front. Recently I received a mild lecture on the contents of a letter which was published in the QL Users' Group newsletter, and in the Trouble Shooter article in the March issue of *QL World*. While I wrote what was true, as I saw it at the time, there were gaps of two months and three weeks between the time I wrote and when the letter and article, respectively, appeared.

Much happens to a new program in a few weeks or months and the March issue of *QL World* also contained an editorial on significant improvements which have been made to *Taskmaster*, dealing with several points which I felt were weaknesses.

New feature

The new or revised features, as described to me, make it very good value. A useful feature previously available only on the Psion Xchange suite has been added; one copy of a Psion program can serve several files, permitting 10 or more Psion jobs to be in the QL at once. You cannot multi-task in the true sense when this is done but you cannot really expect so much, can you?

The program now runs with both *Key Define* and *Ice* — there are some restrictions with the former. There is now a revised version of *Q_Switch*, too, offering switching of more programs, screen dimming, screen saving and a built-in version of *Key Define*, among a variety of improvements, all of which work well on my system. *Editor* can now be loaded by this program and the difficulty I have noticed with *Editor* crashing when run alongside *Quill* is being examined.

Versions 1.16 — for expanded-memory machines — and 1.15 — basic machines — of *Editor* are about to

go into production and should be reaching Digital Precision customers soon. Those who have criticised the program for not being a true replacement for *Quill* should not be too excited because the initial reason for the new release was the availability of Turbo Supercharge — that is, since Turbo was finished, why not compile *Editor* with it? Author Charles Dillon had assembled several improvements/enhancements for *Editor* since writing the 1.098/1.10 versions, and has incorporated them into this latest release. I do not recommend throwing away your copies of *Quill* yet but there is certainly much that *Editor* can offer to word processors and there are more features to follow.

Other uses

You are likely to find other uses for it also — it is very useful for modifying files of any kind. The earlier release of *Editor* would not run with the initial release of *QRam* from *Care/QJump* and *Sandy*, and the reason has been tracked by DP to a "movement of the target" — the target being *Qdos* in this case — made by *QJump*, which upset the running of *Editor*, which had been running satisfactorily to that point. A way round the problem, for DP products only, has been to alter the "xtras" file which *Editor* uses; the 1.16 release will run with *QRam*. The same applies to the current version of Turbo Supercharge.

There still appear to be some grey areas in the definition of the standards required of software and hardware to work with the QL. Sinclair did not complete the job of writing specifications with which other suppliers could work. If changes are made at this late stage to the previously-accepted methods of interfacing with, for example, *Qdos*, existing products will be affected and plans for new products might be upset.

Who says the QL is dead? There has never been a time in its short history when more has been on offer to the happy user. Well up on my list of current wants are hard discs at a reasonable price — say £300 including interface and firmware — and a concurrent spelling checker. Digital Pre-



TROUBLE SHOOTER

C O N T I N U E D

cision has a firm intention of introducing a hard disc at £500 complete but do not start calling about it now, as no date has been set for introduction of the product. A speller is not an easy product to develop; apart from the need to incorporate effective compression routines, to keep down the dictionary size to a reasonable level someone has to type-in the words and someone else has to make sure they are correct.

Spell check

Can you visualise the time it would take to enter, say, 50,000 words, then check every one so that there will be no complaints from users about misspelling in the spelling-checker?

Four people have said to me that they have an interest in producing a speller but none would commit themselves to a firm intent to produce one in the near future. One thing you can expect is more and better desk-top publishing programs; what has happened in the PC-compatible world is bound to affect the QL, although to a lesser extent. The QL products will not necessarily be inferior to the PC ones but there is at least one on the way which aims to have the same range of features as those you may have looked at on much more expensive computers.

If you, like me, have been looking for QL power supplies, you may have been horrified to discover that the prices being asked for them are 20-50 percent of the price for which you can buy a QL. Taken by itself, £20-25 for such a power supply is not unreasonable, except that they are original units which once retailed from Sinclair at less than £10, and must have been sold at less than that some time during the last year or so. Can anyone not offer a suitable supply at, say, £15?

Back-up

My reason for raising what may seem an unimportant point is that many people are obviously buying cheap QLs as back-ups to their main machines and the trade in those QLs will be inhibited by the cost of items such as the power supply, leads and the User Guide — I was quoted £25 for it. Once having obtained a second QL, one is tempted to set up a complete back-up system but where can one get a good colour monitor at a reasonable price? I do not think £250 is reason-

able for the monitor in a system which probably will not get much use; again, if a good computer like the QL can be bought for £100 or less, two-and-a-half times that amount for a simplified TV set seems steep

It seems negative marketing to me. If a few hundred, perhaps thousands, more QLs are put into the hands of users, there will be many thousands of pounds spent on software and hardware for them but the prices of power supply, monitor and User Guide will certainly inhibit some people from buying the QL.

Those who say the QL is dead should look more closely at the QL scene. Various figures are suggested for total sales to date but it seems reasonable to say that 70-80,000 were sold in the U.K. alone, and perhaps as many again overseas. Certainly the *QL World* postbag, and comments from suppliers, indicate that the QL is very much alive all round the world — I am looking at complaints from the Republic of Ireland, Northern Ireland, Sweden, Saudi Arabia, Spain, Germany, Italy and the Netherlands at the moment.

Business booming

Discounting the few machines which may remain in Dixons shops at £99, there may still be thousands more which could be sold. Someone much more aware of the computer scene than I am commented recently that total sales so far of the Atari ST and Amiga are likely to be much less than those of the QL alone in the U.K. Do program writers really believe there is more money to be made by dropping the QL and rushing to meet what looks to be a very limited demand for those comparable machines? If the sale of ex-Psion cartridges is any criterion and I am sure it is, business is booming; there are several suppliers shipping thousands of them overseas and just as many in the U.K. presumably.

R Farmer of Hillhead, Glasgow reported that he had ordered *QL Peintre* from Micro Anvika at the end of January and received a package about a week later, only to find no program cartridge in it. He had not received a replacement when he wrote to *QL World* on February 20. I sent a letter to Micro Anvika on March 17 and received a call on March 18, to say that it had posted a replacement to Farmer on February 19.

Give a thought to the position of the supplier before screaming murder. In this case the program is from a French company and I do not think it is reasonable to expect a retail outlet to open every package it receives from its supplier to make sure there is something in it. Would you expect your local supermarket to open every packet of cornflakes to check the contents? If complaints of missing programs are frequent, they would be wise to do so but then they would possibly be wiser to stop selling that particular item.

Be precise

Bob Morris wrote about Turbo Supercharge, half to say how good he thinks DP Supercharge and Turbo are, and half to complain that the copy of the latter he received does not work properly. As he wrote several weeks ago, I assume he is now happy with Turbo but I would like to hear if that is not so. The letter we received referred to the program crashing and giving an error message not listed in the manual, and to two features not working, but no details were given of either of these reports.

Let us have the exact details. It is no use our expecting to get a positive response from a supplier when we do not elucidate the problem.

Camps Oliver wrote from Valencia, Spain about a copy of *Microdrive Copycat* he ordered from Compware. It sent the program on August 27, 1986 but has now sent another copy, together with a letter of explanation to Oliver.

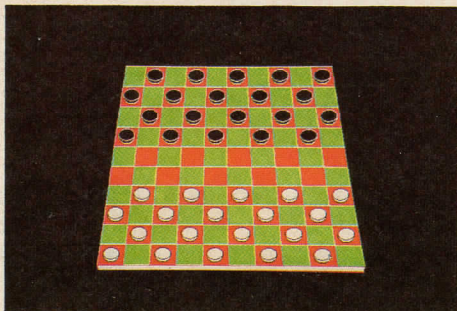
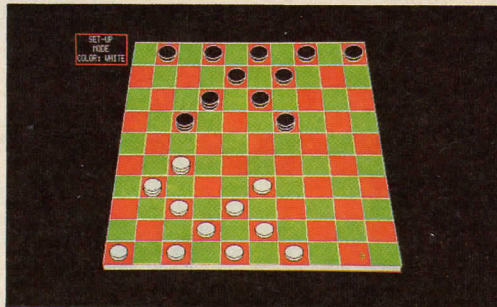
Carlo Cecchetti wrote from Genoa, Italy asking for information about the Oberon Omni reader. The company seems to have disappeared and I cannot help him, so does anyone know where to obtain help on this device?

As Compware pointed out in its letter to me, the relative lack of letters of complaint from *QL World* readers must show that the market is generally healthy. One cannot be certain, however, that a supplier is meeting the general standards just because advertisements appear regularly for several months. It takes some time for an inefficient company to reach a position where it ceases to advertise. Look back to *QL User* times and check how many suppliers advertising then do not do so now. Some withdrew from the QL market but others went out of business, leaving readers out of pocket.

NEW

QL DAM IN 3D

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FEATURES

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Can you write a graphics program in machine code for a draughts game on these machines (68000 without game algorithms).
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- Euro cheque
- International postal order

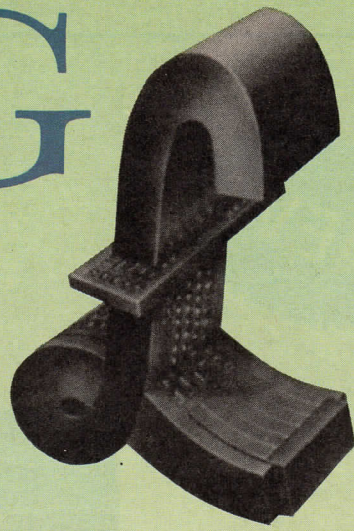
Name.....

Address

.....

.....

DOING THE BUSINESS



In this first instalment of our business software survey James Lucy unearths some fundamental flaws in the approach.

Hands up all those who can remember the early QL advertising. Was not the QL the machine which would provide small businesses with the computing power they needed at a price they could afford? Needless to say it did not happen that way for a number of reasons. Microdrives and early-model reliability among them. More significant, though, was a lack of proper business software. The Psion packages in their version 1 forms were dire, and good though they are now they do not represent the pre-packaged solution which many businesses need. The QL is now at a price level which means that any business, however small, can afford it and there are a number of business packages available at sensible prices — the time seems appropriate for a re-assessment of the situation.

The investment in time and money necessary to put a proper business package together is very significant. Businesses are part of the real world, unlike the fantasy environment created between a games player and the machine; consequently an enormous number of complicated day-to-day considerations must be borne in mind.

For a payroll program, for instance, an individual who has to worry about such things personally, rather than hand the problem to the payroll section, will tell you that the income tax and National Insurance tables are as long as your arm and are subject to

annual change. Statutory sick pay requires the assimilation of several encyclopaedic documents, and just as maternity allowances were sorted out the government introduced the new system, statutory maternity pay.

In short, any of the apparently simple-sounding applications such as stock control are far more complicated than the simple equations might suggest. Much worse for the small-time software producer, such systems tend to require continuing support and updating. Mistakes and bugs in business programs can cost a great deal of money, far more than the cost of the computer equipment and, in the U.S. at least, a number of law suits have so far failed to establish that a software house can disclaim liability for losses caused by shortcomings in its programs.

Against this background it is perhaps a little surprising that some companies and individuals are prepared to step into the breach and supply business software for a £100 computer, the QL. In this article, we look at some programs for business users — some are old favourites and others new releases; between them they are intended to solve a number of business problems from project planning and decision-making to sales and purchase ledger, stock voicing and management. A large number of programs have

appeared, too many to look at in one issue, so to start we have chosen a mixture of the old and the new, the useful and the not so useful.

Project Planner

Project Planner dates from those wonderful days when software houses with a really good program, or in a few cases not so good, could have them published by Sinclair Research, packaged in a solid black plastic slip case with an A5 ring binder, and featured in the multi-page coloured advertisements appearing in the monthly heavies. The silver and black graphics of the outer covers matched the livery of Sinclair's sleek stands at the exhibitions. Project Planner is a product with two goals — first to teach you about scheduling and critical path analysis and second to provide a program which allows you to analyse any particular project you have in mind.

The analysis, in effect, compels you to write down all the component parts of the project, all the small actions which together will allow the project to proceed to a successful and timely conclusion. Each action, known as an activity, is assessed to determine whether it can only take place after other activities have been completed, or whether it can run concurrently. In fact, each activity is given a number, description, duration, pre-requisites



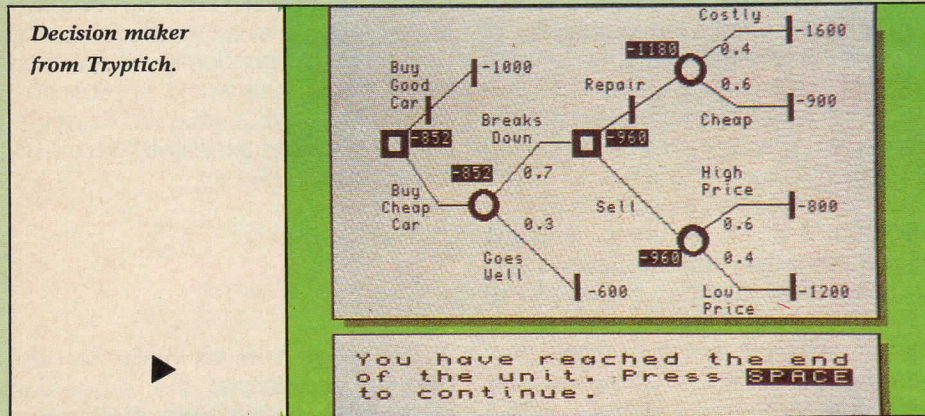
consisting of the other activities which must be done before the one in question and optionally a cost of the activity.

When all this information has been input, it can be digested in a number of ways. The most important is as a horizontal bar chart which, by dint of a variety of symbols making up the bars and a variety of colours, can show the

Project Planner is simple to use and well-presented but a number of irritations present themselves in normal operation. The program is written in Basic, which means that things happen at a rather leisurely pace. Owners of compilers might think they could compile it but unfortunately the program files appear in their tokenised

ter connected to serial port 1 — a program of this type should have a printer installation program with at least as many options as Psion packages and should allow for parallel ports.

Overall, subject to the foregoing criticisms, Project Planner does well what it sets out to do but I must confess some scepticism concerning critical path analysis programs in general. Real-life projects rarely seem capable of being reduced to the cut-and-dried set of activities required by the program, although I accept that the process of identifying, entering and analysing the data is likely to be valuable as a planning exercise in any case. On the other hand, Project Planner will probably save a great deal of poring over calendars, scribbling on pieces of graph paper, and most of all the tantrums when an unforeseen problem occurs mid-project and everything must be re-done. In this respect it is a little like a spreadsheet — the initial entry of the data differs little from a manual system, but just wait until you start playing 'what if?'



critical path through the project — that is a list of those tasks which must be done in sequence and on time to finish the project on schedule. For other activities which are not on the critical path, the amount of free time, or 'float', which can be tolerated without upsetting the final completion date is displayed.

Reports can be obtained which show the earliest and latest starts for each of the activities in actual calendar dates, a real boon particularly as the calendar for the period of the project can be modified to include holiday periods or to allow for weekend working. Milestones, which reflect external constraints on completion of various activities, may also be added to the system — the bank manager may want to see property purchase completed by a certain date, for example.

The two cartridges which make up the training part of the program form a very good introductory course to critical path analysis. A few QLs running Project Planner would be ideal for colleges dealing with this kind of business studies material. The teaching programs are designed to be used with the manual and are useless without but, as the manual rightly points out, it is much easier to read quantities of text from printed page than from the computer screen.

While on the subject of the manual, it is a very well-written and clearly-presented 70 pages, although most of the material relates to the teaching programs and the chapter on the project planner is perhaps a little thin. Good examples are provided, and an index and sensible use of illustrations — proper documentation is vital for business users and this manual makes the grade.

form, suitable for the FLRUN extension (fast load and run) much beloved of software houses wishing to conceal their programs' inner workings. Because this system also requires files with names like '_' (the underline symbol) and indeed files with no name at all it is impossible to store more than one program of this type on a disc — irritating, especially if you have 720K discs.

Just to raise your blood pressure a little further, the 'key cartridge' protection system often associated with FLRUN is used, so disc owners still have to fiddle with cartridges. The use of Basic means that the system is vulnerable to file errors, with no recovery possible, which is not an acceptable situation for business software.

The maximum number of activities which can be entered into the system

Decision Maker

Another offering from Triptych Publishing in the same series as Project Planner is Decision Maker. It shares the same shelf-space, consuming but impressive packaging and the same three Microdrive plus A5 ring binder format. Once again it has two aims — to teach you about decision analysis and decision trees and to provide an applications program which will allow you to assess decisions in your own business.

Decision analysis is appropriate for situations where there is an initial decision to make and, depending on the

Datamanagement's Finance Manager.

MAIN ACCOUNT DETAILS				
Date	Description	Debit	Credit	Balance
Apr 07	Tax		12.51	87.63
Apr 07		15.75		71.88
Apr 09	Video/TV Rental	16.31		55.57
Apr 10	210L I/ F	41.22		14.35
Apr 14			122.94	137.29
Apr 15			221.60	358.89
Apr 16	SOLD CAR		1990.00	2348.89
Apr 16	Subs to QL WORLD	19.95		2328.94
Apr 20			31.20	2360.14
Apr 24	Freezer Food	212.97		2147.17

ACCOUNT NAMES ARE:-

00-09 HOUSE & HOME 20-29 PERSONAL
 10-19 FINANCES 30-39 CAR & VEHICLES
 40-49 SUNDRIES

Press FIRST digit of account group required

is limited to 99 and is apparently independent of the amount of memory you have available — so far as I could tell the system makes no use of expanded memory. Fin-gram assumes that you have an Epson prin-

outcome of the first decision, a number of further decisions will be made or chance events occur. In other words, the various possibilities can be represented in a tree structure with the initial



decision situated somewhere near the top of the trunk — where the branches start.

An example used in the manual concerns the choice between marketing one type of computer, another type, or neither. Each possibility will have a certain cost, profit, or other non-monetary benefit and the program will calculate the course of action which maximises the benefit. It will be necessary for the user to supply figures for the costs or benefits involved at each step and to make estimates about the probability of the various outcomes of the chance events. This means that, initially at least, you may feel you are doing just as much work using the computer as with a manual system but the QL starts to become useful when things change, or unforeseen chance events make themselves known.

Triptych makes some rather grand claims about the capability of the package in the manual but none more so than the suggestion that it enables one to 'project oneself into the future with confidence and dexterity' — budding time-travellers queue here.

The process of entering your decision tree into the computer is relatively straightforward, well error-trapped and with good prompts. As you enter each chance event or decision node a graphics window displays the current decision tree. A range of editing facilities allow whole sections of trees to be transplanted, or branches to be pruned. A number of commands allow trees to be saved, reloaded or analysed in one of several ways. Together with the amendment facility, this analysis capability is the major benefit of running the decision system on the computer rather than on the back of envelopes.

The analysis is based on the concept of expected mean value. Your impoverished writer was once in a position where he had a one-in-ten chance of winning a £6,000 car, a position which, for fairly obvious reasons, has an EMV of £600. When he tried to sell this chance to richer friends he discovered that most people prefer a certain £600 to a possible £6,000 but that is another story. The car went elsewhere. Anyway, the first analysis

carried-out on the tree is called a 'roll-back' which involves calculating the EMV at each node in the tree, starting from the twigs and working back to the trunk. When this is complete the overall expected gain from the decision is reached and can tell you whether it is worth embarking on the project.

If the project is worthwhile overall, you will also need to know the 'risk profile'. This shows the probability of each of the possible outcomes — a 90 percent chance of losing £10,000 might be very unattractive in comparison to a 10 percent chance of making £1 million if losing the £10,000 would bankrupt you, even though the EMV is £91,000. Another feature of Decision Maker, sensitivity analysis, allows you to check how changes in pay-offs or probabilities will affect the EMV of the system, which in turn will indicate how sensitive the system is to errors in your estimates.

A related topic, explained in the tutorial section, concerns calculating the value of information which allows you to eliminate some of the chance nodes, or to make better forecasts of outcomes. For those in the know, these are EVSI/EVPI, the expected value of sample or perfect information.

Much of what has been said earlier about the operation of Project Planner applies to Decision Maker, too. The programs are again in tokenised Basic but in the case of Decision Maker seem to run a little faster — perhaps there is less calculation going on. There are a number of functional limitations, in particular a maximum list of 149 nodes, with a maximum of five branches from each node. This seems plenty and in any case it is possible to work round the limitations with some tricks described in the manual.

The many users of the Tebby Toolkit should unplug their ROMs, because some of the teaching programs use variable names which are defined as keywords in the toolkit — this is the kind of thing which can really confuse business users who do not have the time or inclination to involve themselves in technicalities. Again, printer support is very limited, although you can at least change the transmission rate — users of disc interfaces with parallel ports will have to do some fairly complicated file patching — not what one would expect from a business package.

While it requires a little minor skulduggery, it is possible to examine the original SuperBasic code of both Project Planner and Decision Maker, and that yields a surprise — the code is pro- ficient but makes very little use of

the structures of SuperBasic. If I were intending to use either package professionally I would remove the absurd copy protection and compile the programs — perhaps Triptych could be persuaded to do this in an updated package.

Once again you will have to make your own decision about the automation of decision-making. Decision Maker represents an excellent training package for academic study and might have commercial applications, depending on your view. It is a competently written and excellently documented product.

Finance Manager

This program is not really for business at all, despite the suggestion made in the introduction of its documentation that it is suitable for individuals, clubs and small businesses. It is an elaborate system for keeping track of your bank balance, allowing not just entry of payments and receipts but also automatic handling of standing orders and the ability to compare budget figures with actuals.

The program includes an asset register, which allows your estimate of the value of current assets such as house, car and other possessions, or liabilities to be stored, updated and totalled at any time — useful if you have not grown out of the childhood habit of emptying the piggybank to count the contents. For a club, of course, the asset register would be a useful way of keeping a property book.

For your money you receive a 20-page daisywheel-printed A4 manual with a Microdrive stuck inside with sticky tape. The manual is clearly written if a little variable in level — it tells you where the QL re-set button is, for instance. The main program, which is written in SuperBasic and is about 50K long, runs fairly smoothly on the whole, although some of the routines used to emulate the line editing feature of the QL can leave the 'chequerboard' undefined character symbol in odd places.

At other times you have no cursor and have to guess where you are. If the program had been tested by a few users before release I feel sure the fancy shadow writing of the program title which takes place whenever a new screen is selected would have been removed — the novelty soon palls.

As mentioned, the program is in SuperBasic and takes an age to load. The obvious answer to me would be compilation, although admittedly the present method of distribution allows



the users to customise the program, particularly for printer parameters, before submitting it to the Data Management fast load routine. The routine stores and re-loads the program in tokenised form, by-passing the parsing which normally takes place when a SuperBasic program loads and which is the cause of all the shuttling Microdrives and the hanging around. Since the fast-load routine can be used on other SuperBasic programs it is perhaps one of the more useful parts of the package, although Data Management warns that it will not suit all QLs.

Looking after your bank balance with this program seems like using a piledriver to crack your breakfast egg. As one who is hopelessly *laissez-faire* with finances, I must admit that the program and I are temperamentally unsuited, which might explain why I disliked it. If, however, you are a retired 95 percentile dull accountant, or someone who uses Quill to write notes for the milkman, you might find profound joy in QL Finance Manager.

Small Trader's Pack

This is really one in the eye for purveyors of IBM software who divide their business packages into small modules and then sell each for about £400. For slightly more than £20 you get sales and purchase ledger, stock control, mailing list keeper, sticky label designer, telephone directory, point-of-sale display generator, a metric/imperial units convertor and an on-screen calculator. There must be a catch, and there is. All the programs are written in uncompiled, non-fast-loaded Basic and are about as simple as it is possible for them to be. Nevertheless, you cannot complain about the quantity.

All the programs fit, almost, on a single Microdrive cartridge and are accompanied by a dot matrix-printed manual of some 20 unnumbered pages. The manual is well-written and pitched at what seems to be an appropriate level, although it is perforce very succinct in its (sic, frequently) very few pages. The program which runs on start-up presents a menu from which all the other programs are selected. As all programs are in Basic they take an age to load, and each re-loads the start-up program on its completion. This means that the kinds of programs which can be very useful and time-saving if they are available instantly, at the touch of a 'hot-key' become more trouble than they are worth — calculators and telephone directories, for instance.

Sales and purchase ledger are each limited to 500 transactions per file. A number of useful options are available,

among them being a VAT summary print, a list of payable accounts, and the facility not just to add but also to delete transactions. This last feature will have the accountants throwing up their hands in horror, because you are not supposed to do that. Errors are supposed to be corrected with *contras*. The ledger routine had an appealing simplicity — someone changing from manual bookkeeping would probably feel very much at home and take to this system well.

The stock control package is once again simple and smooth in operation; 500 stock items can be accommodated

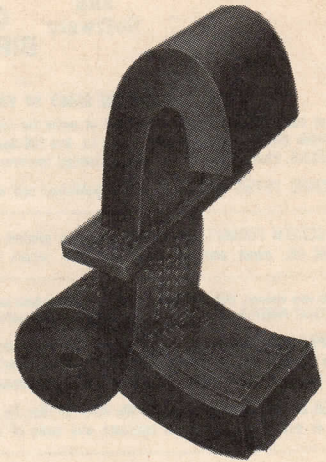
Information

Program	Supplier	Price
Project Planner Decision Maker	Triptych/ Sinclair	£24
QL Small Trader's Pack	SD Microsystems, PO Box 24, Hitchin, Herts Tel. 04626 75106	£20
QL Finance Manager	Data Management, Clark House, The Village, Haxby, York YO3 8HU Tel. 0904 760847	£17.95
All of the above software is available from the usual retail outlets, some of which advertise elsewhere in the magazine.		

and the process of recording stock delivery or despatch is straightforward and logical. Stock items can be called-up either by stock number or description, although in the latter case it was necessary to describe the item precisely — no fuzzy matching. Each item can have a minimum holding level assigned to it and the re-order report will identify those items whose current stock level is below the minimum for re-order purposes.

The mailing list module allows up to 200 addresses to be stored on file, deleted, altered and printed-out as required. There is no facility to print just a selection of the addresses. Since space is provided for notes along with the name and address, small traders may find themselves falling foul of the Data Protection Act — it would have been pleasant to see a warning in

The rest mentioned in the introduction all



enough — the 'Billboard' point-of-sale display is a good idea but most people are likely to want something more eye-catching with more colour and life — a number of routines have been published in this magazine and elsewhere showing all kinds of clever tricks with text and none of these has been used. Users intending to modify the code for their own uses will find themselves entangled in a spaghetti of GOTOs and GOSUBs — this is very Basic.

The Small Trader's Pack is very much 'toe in the water' stuff. It is slow, makes no attempt to protect your files, deviates from accounting practices, has no protection from file errors or accidental program breaks, does not anticipate the existence of parallel printers or discs and is limited to the volume of transactions. On the other hand, it is simple to use, offers a good deal for the money and could prove very satisfactory in the appropriate situation.

The Bottom Line

So far, so so. The Triptych packages in their specialist fields work well but I suspect that QL users who make serious use of them in business are few. In absolute terms, the other two fare badly. They manage to stay afloat in the relatively sheltered waters of the QL software harbour but would sink without trace in the rough seas outside — it is sad to say that they share this characteristic with so much QL software.

Business users impose the greatest possible demands on software packages and expect them to be bomb-proof, bug-free, fast and accurate. Next month we will look at two payroll packages, an invoicing program, and another sales and purchase ledger program. Some of them run under Archive, the runtime version, and look very promising.

MAKE THE MOST OF YOUR QL

for home or business use - Order from list or write for current catalogue. Prices include VAT and postage within the UK. Cheques with orders to, and full descriptive list available from, PDQL at our NEW ADDRESS. Please state if you have extended memory and/or disc drive.

Make ARCHIVE TUTOR your guide to the published and unpublished commands and functions of Archive. **£21**

ARCHIVE SCREEN FORMAT PRINTER produces a printed copy of your Archive screen layout; a directory of ink, paper and file name; variables, where they occur, field size, row/column co-ordinates. **£7**

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FILE COMPARATOR compares two files on the same or different volumes and highlights any differences down to the last comma. Both files are displayed one above the other sector by sector in character, hex or decimal. Easy re-alignment after comparing any two sectors. **£10**

FILE COPIER copies from one volume to the other all files, by y/n selection or up to three string match inclusions or exclusions; compares contents and sizes of all files on any two devices (including ram1.) **£8**

PDQ XREF provides a FULL CROSS REFERENCE index of your SuperBASIC programs to screen or printer; logs all variable, procedure, function and extension keyword usage; provides error diagnostics on likely source code faults. INDISPENSABLE FOR LARGE PROGRAMS **£15**

★ ★ ★ PLUS ★ ★ ★

ARCHIVE SCREEN DESIGNER	£15
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DATABASE ANALYSER	£7
LAZARUS Disc File Recovery	£20
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(new users)	£80
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VAT ACCOUNTS	£25
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PSION SOLUTIONS

One of the main advantages of disc drives is their large storage capacity. It is odd that it can also cause problems if, like me, you use different printer drivers for programs calling for a *printer.dat* file and realise, almost invariably, that you have the wrong driver installed just as you press the "PRINT" button.

I use Elite and a range of printer control and translate code for Quill and only translate codes, for Abacus — with a preamble for condensed typeface, 132 characters per line and a post-amble re-setting the typeface to elite — and Archive — pica and a different set of translate characters.

The obvious answer is to re-name the *printer.dat* files so that they are exceptional to each of the Psion programs. That requires that correct calls occur between program and driver. The solution is to modify the Psion programs so that each will call for its own driver.

Load your back-up of each Psion program, in turn, into *The Editor* with the *ru-PROGname* command. Editor will be in over-write mode. Do not change this to insert. Also be careful not to enter any characters accidentally.

Press <F3>, and input *t f/printer/*. The Editor cursor will stop on the first occurrence of "printer", which is the only call for the *printer.dat* file. The character separating *printer* from *dat* is a null and must not be changed.

At the cursor position, enter the new name for the printer driver, using exactly the same number of letters. For Abacus, Archive and Quill, I use ABprint, ARprint and QUpriint, respectively. After changing the name, press <F3> w- <ENTER> <ENTER>. Editor will over-write your old program file.

Once you have the relative printer drivers configured to your requirement, either save them or re-name them as files using the names you have used for the program calls.

Customising the Psion suite, further keeping it in line with current QL multi-tasking environment, there are seven other files which can be used on a single medium — the *printer.dat* and *install.dat* files used by Quill, Easel and Abacus. They can be saved as re-named files, relevant to the program to which they apply. The seventh, how-

Each month *Sinclair QL World* staff and contributors will combine their talents on the Psion Solutions page. This awesome bank of knowledge will be applied to problems readers encounter. Ron Massey provides some useful Quill tips.

ever, requires some simple modifications — the addition of a new variable and a new procedure for initialising it.

Load *install.bas* and open window #2 to full screen — *window#2,512,202,0,0 : cls#2* — this makes the listing easier to read. To the end of line 1, add
CLS #7 : Prog_Select

Go to the bottom of the listing and add the following, with suitable line numbers:

```
500 DEFine PROCedure Prog_Select
510 CLS : CSIZE 0,1 : INK 0
520 PRINT \ TO 25; 'SELECT PSION
PROGRAM TO INSTAL DRIVER FOR
530 PRINT \ TO 35; '<1> Quill'
540 PRINT \ TO 35; '<2> Abacus'
550 PRINT \ TO 35; '<3> Archive'
560 REPEAT prog_1p
570 key = CODE(INKEY$)
580 SElect ON key
590 = 49 : prog$ = "QU"
: EXIT prog_1p
600 = 50 : prog$ = "AB"
: EXIT prog_1p
610 = 51 : prog$ = "AR"
: EXIT prog_1p
620 END SElect : END REPEAT
prog_1p
630 CLS
640 END DEFine
```

This procedure will initialise the *prog\$* variable before starting into the original part of the program.

Search through the listing — about one-third of the way down — for a PROCedure called *init*. The line requiring the addition of the *prog\$* variable reads:

```
mp$ = "_printer_" : mi$ = "flp1_
install_" : pkc$ = "press SPACE to
continue"
```

Insert the variable in two places so that the line reads: *mp\$ = "_"* &

```
prog$ & "printer_" : mi$ = "flp1_" &
prog$ & "install_"
: pkc$ = "press SPACE to continue"
```

Save the new version of *install.bas*. When you next change printer drivers, *install.bas* will call for the correct *install.dat* file for subsequent modification.

```
1 MODE 0 : OPEN #7,"scr" : WIND-
OW #1,512,210,0,45 : WINDOW #
7,512,45,0,0 : CLS#7 : Prog_select
2 CLS : CLS#7 : CSIZE #1,1,0 :
CSIZE #7,1,1 : init
```

```
86 DEFine PROCedure sv
89 OPEN_NEW #5 : mi$&"tmp" :
PRINT #5, "insl" : PRINT #5,i$ :
PRINT #5, nd
106 CLOSE #5 : DELETE mi$&
"dat" : COPY mi$&"tmp" TO
mi$&"dat"
107 DELETE mi$&"tmp"
```

```
145 mp$ = "_"&prog$&"printer_
mi$ = "flp1_"&prog$&"install_" :
pkc$ = "press SPACE to continue"
```

```
179 OPEN_IN #5,mi$&"dat" :
INPUT #5,a$
```

```
437 DEFine PROCedure Prog_select
438 CLS : CSIZE 0,1 : INK 0
439 PRINT \ \ TO 10;'SELECT
PSION PROGRAM TO INSTALL
DRIVER FOR:'
440 PRINT \ TO 15;'<1> Quill'
441 PRINT \ TO 15;'<2> Abacus'
442 PRINT \ TO 15;'<3> Archive'
443 REPEAT Prog_1p
444 key = CODE(INKEY$)
445 SElect ON key
446 = 49 : prog$ = "QU"
: EXIT Prog_1p
447 = 50 : prog$ = "AB"
: EXIT Prog_1p
448 = 51 : prog$ = "AR"
: EXIT Prog_1p
449 END SElect
450 END REPEAT Prog_1p
451 CLS
452 END DEFine
```

Send your Psion questions
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Greencoat House
Francis Street
London SW1P 1DG

ECONOMY DRIVE

The move up to a disc-based system need not be an expensive one, as David Hawthorne demonstrates.

A major concern of most users contemplating upgrading to a different type of main storage medium is the initial investment for the adaptation hardware. Providing that QL peripherals need not be expensive, the three main components of a disc-based system are the subject of this report — the drive unit, power supply and the connecting cable.

When deciding to upgrade to a disc-based system, one has to consider the range of options available. Both 3½in. and the current industry-standard 5¼in. disc systems are available in either 40- or 80-track configurations; some include an option for track-range switching. Further complicating the choice, drives are available in either double- or single-sided variants as well.

A complete disc system consists of single or twin drive units — available with or without power supply — an interface/driver — available optionally with or without some form of toolkit aid — inter-connecting cables and a supply of discs.

There are a number of good interfaces for the QL

and in a variety of price ranges and configurations; some include memory expansion in increments of 64K to 512K additional RAM; others are available without extra RAM. Some

include a toolkit, either the full *Tebby Toolkit II*, a toolkit supporting file-handling functions or a proprietary toolkit released by the suppliers of the IF.

Users have the option of either putting their memory expansion on their disc interfaces or using internal memory expansion such as the Inpholink internal 512K RAM memory upgrade card.

DS Enterprises is offering Olivetti 5¼in. disc drives as component parts, without housings,

power supply or connecting cables for a very reasonable, as subsequent experience proved, £37.95.

A 34-way ribbon cable is used to connect the disc drive unit to the QL interface card with a keyed twin-row 34-way female socket. The drive-end requires a standard 34-way PCB edge connector for use with double-sided PCBs.

No soldering

You can either have the cables made up to your requirements or, by obtaining the cable and fittings, make your own. DIY enthusiasts will need a good, smooth-jawed bench vice to clamp the connectors to the cable; no soldering is required.

Ribbon cable requirements will vary according to drive

It is worth remembering that most ribbon cables are manufactured so that one of the conductors, coded with a distinctive stripe, usually identifies pin one of the connectors at each end of the cable; the connectors are usually pin-numbered.

If your interface handbook includes a disc drive connection guide — figure one is taken from the manual for the Sandy *Super Q Board* — you will notice that only the even-numbered pins are used for the drive signals. The Olivetti PCB requires a double-sided 34-way edge connector, only the top 17 of which are used.

Unless you obtain a PCB connector from Olivetti, it is unlikely that the edge connector of the drive will be polarised,

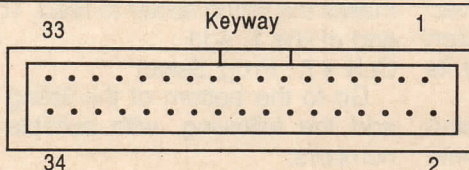


Figure 1. Disc interface connector.

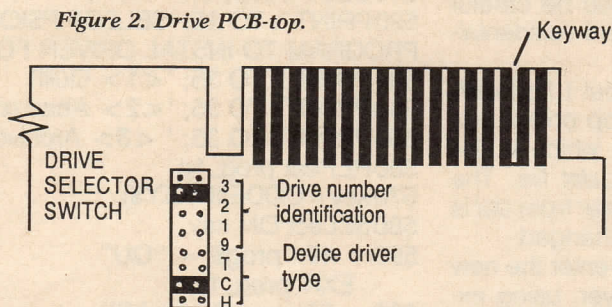


Figure 2. Drive PCB-top.

configuration. Cable length considerations aside, and assuming you have the interface connector available, you will need a single PCB edge connector for one drive or two PCB connectors, spaced about four inches apart on the cable for twin drives.

If you plan to integrate the 5¼in. drives into an existing disc system as flp3/4, for example, you will also need to have a male connector of the type used in the QL IF card into which your existing drive cable

making installation of the connector wrong way around very difficult to all but the most determined. The polarised IF connector key slots into the male connector on the disc interface in the QL and faces upwards.

The power supply, completing the project ensemble, is a switched-mode unit available from Viglen for £29.95. Compact and completely silent, this universal power supply can be used

with single or twin floppy drives of any type, or with a Winchester.

Measuring 14.5cm. x 8.5cm. x 4cm., external connections from the Viglen power supply include two standard disc-drive PCB power connectors, a pair of wires for use with drives supporting both 40- and 80-modes, and a mains lead.

Controls on the panel consist of an off-on switch and 40/80-track selector switch. The selector switch is not required for the Olivetti drives, as they are 40-track drives. Users can either make their own housing for the drive unit or obtain one ready-made from many computer peripheral supply houses.

Smooth running

Having connected the power supply, PCB cable to the drive on one end, and the Super Q Board on the other end, switching everything on, I formatted my first 5¼in. disc — I normally rely on my twin PCML 3½in. drive system. The disc formatted successfully to 720 sectors.

In my experience, some 5¼in. drives can be very noisy. My first impression of DS Enterprises "economy" drives, however, is that they are exceptionally quiet and

taken by the Olivetti drive.

For the majority of applications, extra memory is not an absolute requirement but Quill users will need at least 64K extra RAM available; disc systems require about 1.5K of memory for their purposes.

If Quill is loaded from disc on an unexpanded QL, Quill will attempt to open a *def-tmp* file for its code space and then announce that it cannot start up. Although memory is proportionately scarce for the other Psion programs, they will work with an unexpanded, disc-based QL.

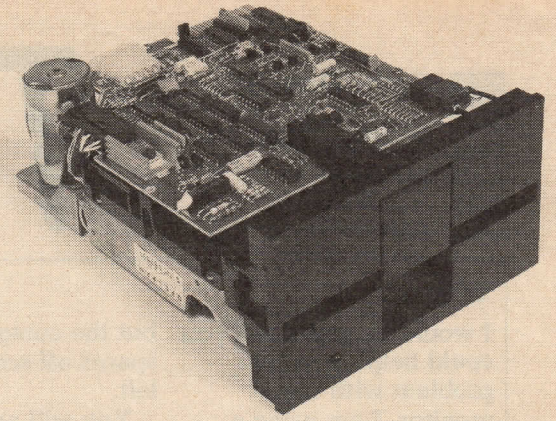
In addition to increased reliability and faster loading times, consideration of operating costs provides an

Medium	Track	Formats	Storage	Unit Cost (typ.)	Typ. cost per 1K
Microdrive cart	—	210+sectors	107+	1.00	0.93p
5¼in. disc	40 DS	720 sectors	360K	1.95	0.54p
5¼in. disc	80 DS	1440 sectors	720K	1.95	0.27p
3½in. disc	40 DS	720 sectors	360K	3.00	0.83p
3½in. disc	80 DS	1440 sectors	720K	3.00	0.42p

indication of the value of a disc-based system. If you shop around, 5¼in. discs are available at often less than half the cost of their 3½in. counterparts.

The latter, however, more mechanically

The Olivetti 5¼in. drive. Very reasonable at £37.95, but extras required.



100K or so of storage is becoming more economically attractive. Disc drives formatting to 1,440 sectors (80-track) or 720 sectors (40-track) represent a storage capacity increase of seven and three-and-a-half times, respectively. There is also the option of single-sided drives, reducing storage capacity by half. Typical storage costs are indicated in the table:

wishing to integrate a 5¼in. disc system into an existing 3½in. system can do so easily by setting the Olivetti selector switch — located adjacent to the PCB connector at the rear of the board — to the relevant drive identification number — see figure two.

This selector switch also has a second jumper for adaptation to the type of device used in the interface. If you cannot get a disc to format with the second switch across the terminals marked "C", as in figure two, it may be that your device driver is non-standard and you will need to try either of the other two positions.

If and when the Ultrasoft CP/M emulator appears, programs will probably require 5¼in. drives. Another application is archiving data and programs on a less expensive medium.

I liked the combination of the DS Enterprises Olivetti disc drives and the Viglen power supply. Both are exceptionally well-made and promise long service. Users

Pin	Connection	Pin	Connection
2	N.C.	20	Step
4	N.C.	22	Write Data
6	N.C.	24	Write Gate
8	Index	26	Track 00
10	Drive A	28	Write protect
12	Drive B	30	Read Data
14	N.C.	32	Side 1
16	Motor On	34	N.C.
1/33	Gnd.		

positively reek of smooth-running, good quality.

Copying my master Quill cartridge to 5¼in. disc, I input *flp_use mdv*, rather than changing the Quill boot, loaded Quill and was astonished at the very short loading time

comprehensive, provides a shutter, protecting the sleeved magnetic medium from accidental contact with the outside world and a sliding "switch" to write-protect the disc.

With the plummeting cost of cartridges, their

Information

Olivetti 5¼in. disc drive units at £37.95:

DS Enterprises
25 Trinity Rise
London SW2 2QP
Tel: 01-671 0209

Switched-mode power supply for single or twin drives at £29.95:

Viglen Computer Supplies
Unit 7
Trumpers Way
Hanwell W7 2QA

Ribbon cables and end connectors:

From almost any good peripheral supplier, or WAH Data Systems Co Ltd
Albany Terrace
Victoria Gardens
Chatham,
Kent ME4 6TH
Tel: 0634 404200

Colin Opie has
some advice on
monitor
connections

TECHNICAL

Video . . .

I would be grateful if you could help me with a problem with my monitor. I am using a Ferguson TX monitor/television rented from Radio Rentals. When I use it as a TV, pressing F2 the cursor is just visible bottom left and all seems normal. If I want to use it as a monitor, pressing F1, I get my three windows

but the cursor is six spaces off-screen to the left.

You will appreciate that any programming in this mode is rather difficult, losing six letters on every line. Radio Rentals tell me that there is nothing wrong with the set, so what can I do?

**A. A. Lumb,
Pontefract.**

Video . . .

I acquired a Miracle modem at the 21st ZX Computer Fair. After buying it I realised the cost of running would be greater than originally expected. So to help reduce the cost I bought a Teletext TV to have access to some of the data found on the modem at my fingertips. After examining the TV I found an RGB input port which I later decided to put to use.

Not having the proper lead at the time and knowing the price it was decided that a DIY job

would be carried-out. After connecting the lead to the QL RGB port and connecting each wire in turn on different points on the TV RGB the computer re-set itself. Not being able to see the screen the computer was generating I continued connecting wires.

It was only then that I realised that there was something wrong so I connected the computer as normal to the TV and found I had shorted the computer.

**Lee Miles,
Dartford.**

. . . and more video

I have a slight problem which may also affect other readers in the same way. Earlier this year I purchased a QL with a Serial 8056 printer and have so far been pleased with the results. Recently I decided to make a program which could be used as a logo on the beginning of a video film. After a great deal of effort, by experimenting with various sounds and so on, I managed to get exactly what I was after. That is the beauty of the QL. It was easy, using SuperBasic. The rest was

straightforward. I recorded all the sounds on a C60 cassette, ready to input directly into the video. When it came to videoing the program from the QL to the video, that is when my problem arose. I found no video output port. It was possible on my previous computer.

There must be a simple solution to the problem, mainly as I have no technical skills.

I remain an ardent supporter.

**J. M. Murphy,
Milton Keynes.**

A number of questions have been raised about the use of video signals from the QL. Lumb is not seeing all he should do, Murphy feels that the QL does not have a video port and Miles blew up his first QL.

The choice of video monitor for use with a QL is perhaps not so obvious as you might think. Most microcomputers have at least two modes of screen output — a low-resolution, 80-column screen. The QL has, of course, to be different and gives you the option of a 37-column TV screen or a 85-column monitor screen.

There are usually no problems when using either standard TVs or low-resolution monitors with TV mode on the QL but the QL monitor mode screen is another story. Most monitors are set up to display correctly 80 columns of text but we know the QL needs 85 columns. The result is that some of the text disappears, usually off the left-hand side of the screen.

That is particularly unfortunate in that, being European, we tend to write left to right and our computers expect us to enter commands in the same manner. That is why Lumb cannot see what he is typing-in. When using colour, you must also watch for the resolution of the screen. For strain-free viewing you should not use anything less than a medium-resolution monitor — most general-purpose colour TVs and monitors are low-resolution. If you can afford it, and will make

good and constant use of QL colours, you could buy a high-resolution monitor. In any event, whether using black and white or colour, a TV or monitor must be able to display 85 columns of readable text without bending of the display or loss of synchronisation. That implies that we need to obtain our adapted TV or high-bandwidth monitor from a reputable dealer in QL accessories.

Miles' success in blowing-up his QL is due to his failure to determine for what each pin on his Teletext TV RGB input socket was used. Many TV RGB input sockets also have a low DC voltage output pin used by manufacturers of video accessories. Connecting any of the QL video leads to that pin will almost certainly destroy the video output of the QL.

Never attempt a DIY job of this nature unless you understand fully what you are doing. If you know what you are doing I hope it will be superfluous to tell you that you must first determine exactly which pin on your TV socket does what.

As an aside, Miles' solution was to buy another QL, on the basis that he would have to wait forever to get his old one returned by a repair dealer. I would advise against such a drastic measure. In the September, 1986 issue of *QL World* there was an article on getting QLs repaired. Provided you go to a listed repair centre and ignore any warranty claim on your QL, a busted video stage should not be expensive to repair

HELPLINE

Write to:
 Technical Helpline
 Sinclair QL World
 Greencoat House
 Francis Street
 London SW1P 1DG

and you could look forward to getting your QL back within two to seven days.

"I found no video output port", cries Murphy when attempting to connect his QL to a video recorder. What he meant is that he could find no socket on the back indicating 'VIDEO' in bold white silk-screened print. Why not? — because Sinclair in its wisdom decided to put RGB, VIDEO, PAL and SYNC signals all on the one socket labelled RGB.

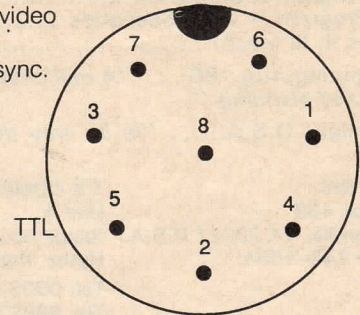
Figure one shows the pin layout for the RGB socket as viewed from the back of the QL. It is therefore also the layout when viewing the back of a DIN plug while soldering together a lead. Some readers may notice that figure one does not agree completely with the layout given in some QL manuals. That is because

those QL manuals were incorrect.

If you are useful with a soldering iron, or know someone who is, you should be able to connect your QL to almost any video display/recording device. The warning given earlier naturally still applies — do not do it if you do not understand video signals fully or do not have complete pin layout diagrams for all connectors.

Ed Bruley of Care Electronics, an expert in such matters, also warns about a problem over this 8-pin DIN connector. He says: "Some monitors/TVs use a 7-pin DIN plug but have an 8-pin DIN connector on the back of the set. The unused eighth pin — central one — can be a low-voltage output. Unfortunately the QL connector will therefore fit this socket, with disastrous results."

1. Monochrome video (b/w)
2. Common ground ()
3. PAL colour video
4. Composite sync.
5. — (nc)
6. GREEN
7. RED
8. BLUE



(Viewed from rear of QL
 i.e., solder side of monitor lead plug)

Figure 1. QL RGB/PAL/VIDEO/SYNC socket.

"We always fit a 7-pin DIN for the monitor end, an 8-pin DIN for the QL end, and tell customers that the 8-pin DIN must always go to the QL."

Care Electronics also sells a wide variety of video-TV connection leads

and may be able to solve your connection problem immediately.

The company can be contacted at 800 St Albans Road, Garston, Watford WD2 6NL. Tel: 0923 672102.

Save the Screen

I have been for some days writing a screen designer program for my use but I am unable to solve the problem of saving the screen.

I would like to know how to make characters. I have looked through

previous magazines but it does not help to create my own characters.

Could you suggest any good books which would be useful?

Mark Fisher
 Port Talbot.

Screen-saving on the QL can be extremely easy, providing you do not mind using 32K of storage to do it. The screen starts at memory address \$20000 (131072) and finishes at \$27FFF (163839). The easiest way to save it to Microdrive is to have the command: SBYTES mdv1_picture,

131072, 32768 in your screen design program. To get back the screen, all you need to do is execute the statement: LBYTES mdv1_picture, 131072

You can, of course, use discs if you have them and the name of the saved picture data file can exist in a string variable.

```
Your program might then contain something like:
INPUT "Name of file to save?";fyle$
fyle$="mdv1_" & fyle$
:
<design the screen>
```

```
SBYTES fyle$, 131072,
32768
```

Another way to save the screen data is to use a compression algorithm. That will usually occupy much less than 32K of storage space with no loss of definition. In the December, 1986 edition of *QL World*, James Lucy described a method for doing it and program listings were supplied.

Moving to the design of characters, there are many articles describing the process, together with programs which allow you to do it. The June, 1986 edition contained an article and program listings, again by Lucy. Commercially-available font editors are also available, notably Inkwell by Palantir Products, 60 St Lukes Road, Bedminster, Bristol, and Character Font Editor by Care Electronics, 800 St Albans Road, Garston, Watford, Herts WD2 6NL. Tel: 0923 672101. Both editors sell for around £10, which must be good value.

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Ron Massey checks out three packages designed to make life easier for the aspiring QL programmer.

Compare PDQL £10

Another utility from the PDQL/Dillon team, a very useful universal file comparator *Compare* is set up as an interactive task in which the contents of two specified files are compared in separate windows and indicates any content mismatches from a common but re-settable starting point for each file.

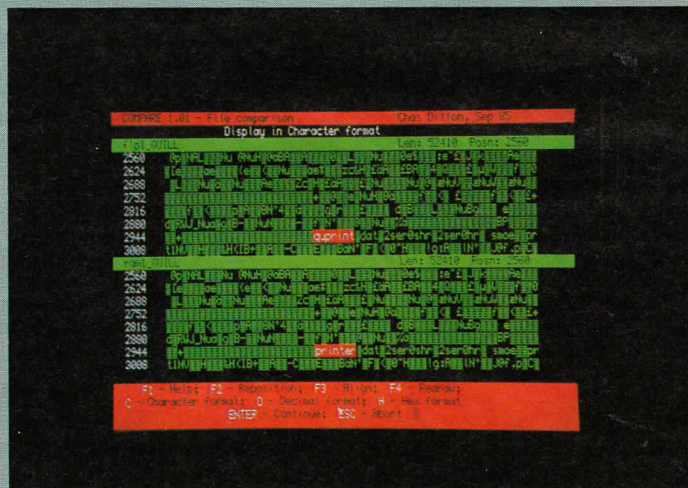
The Compare display includes virtually all the information concerning each of the two files which can be used to obtain file matches where at all possible and includes reference details of the source drive and file name, length of file and starting address of the 512-byte block currently displayed.

File address values are given on the left side of each line. Displays may be made optionally in either character format, decimal format, with a character block, or in hex, also with a character block. Matching characters are displayed as green on black; file mismatches, whether with regard to content or relative position, are highlighted as white on red.

System controls include a facility for moving a specific line from each file in a window at the bottom of the screen to

attempt re-matching the remainder of a pair of files if differences occur, as one example in the case of SuperBasic

RAM disc, was the original master copy of Quill bundled with the QL. Needless to say, the system worked very well



Compare - essential.

program line indents.

Small position adjustments, accessed by pressing <F3,> may be made by "sliding" a line from either file to the left or right using the cursor key which, if used alone, moves the line of the first file.

Pressing <F2> allows you to increment file pointers by specified plus or minus amounts to align file contents in an attempt to match the remainder of a file block. Offsets of using this facility are echoed in the line addresses to the left of the screen.

Bench-testing Compare, I used two Quill program files with known differences. File one, the version I use as a working copy, had been re-configured to run from disc and included an additional change to the call name used for the printer driver — *printer_dat* to *QUprint_dat*. File two, loaded into

and indicated 15 mismatches.

Should both files be identical in all respects, no display of file content will occur. Either way, when the file comparison is complete, a report is displayed of the number of character comparisons made and the number of mismatches, if any, encountered.

While comparisons of any kind of file can be made using Compare, its greatest strength is its ability to indicate mismatches arising from comparing two files, when either could be the most recent version saved, or locating file corruption when a suspect file is compared to a known working version.

One of the collection of Dillon media utilities, Compare is essential for anyone requiring information concerning their files, whether for programs or data.

Q Plus Sandy (U.K.) P.C.P. £14.95

A first venture into the field of QL software-only releases, the Sandy *QL Plus* is a useful toolkit with a large variety of applications and is aimed at providing a user-friendly environment. When the master cartridge is run for the first time, user responses to prompts configure a working copy to your machine requirements and take into account the availability of RAM disc and Toolkit II.

Nine function keys, <F1> to <F5> and <SHIFT> <F1> to <F5,> can be programmed for particular applications, such as obtaining directories, calling the system "HELP" menu, or initialising executable programs associated with the keys.

<SHIFT> <F4> was not used in the version (2.36) supplied for review.

By including "&chr(10)" at the end of the command string, the command will be executed immediately. Otherwise the command is entered into window # 0 only. Commands may also be attached to a combination of <ALT> and other keys.

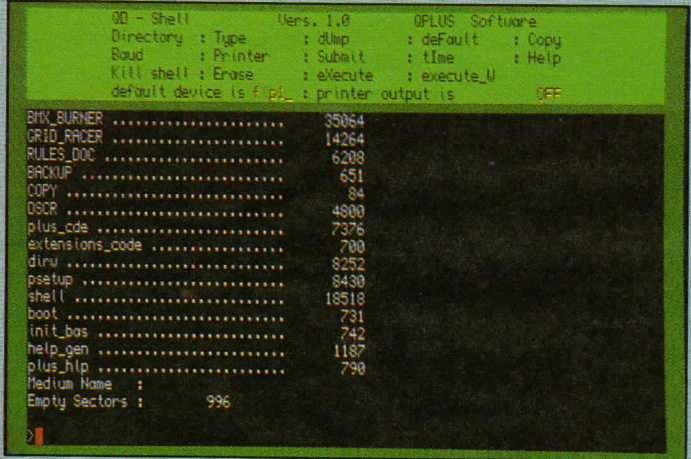
Directories of a drive may be obtained in either the conventional manner or, by inputting *SDIR 'DEVICENAME'*, a screen-based directory, listed in columns, will be made.

A routine for producing fast-loading SuperBasic programs has been included in the Q Plus repertoire. After loading Q Plus, load your Basic program. Inputting *FSAVE "device filename"* — the quotes are mandatory — a snapshot of the interior of the QL

UTILITY FILE

is made and saved as a tokenised file. Fast-load Basic programs can be up

PSETUP, is an entirely menu-driven printer controller. Conventionally compatible with Epson printers, a range of control codes for underline, bold, condensed, italic and double-width typefaces can be selected. In addition, a printer may be



Q Plus. Genuinely useful.

and running in 10 to 20 seconds, almost regardless of size.

Q Plus must be loaded prior to subsequent loading of programs saved with this routine, using either the *FLRUN* or *FLOAD* commands.

Three points must be borne in mind regarding this facility. Files are *QL* configuration-dependent and may not be compatible with other ROM versions or add-ons. Files may not be modified unless loaded using the *FLOAD* command and must be re-saved using *FSAVE*. Because of the nature of the routine, files can grow up to three times larger than the original Basic file.

The *Q Plus SHELL* utility provides a user-friendly interface for file-handling and includes the usual directory, format, delete, re-name and copy functions, all available mostly with single keypresses. Dumps of specified files may be made from within *SHELL*, as can complete control of printer control codes.

A separate module,

re-set to its default typeface, perform a form-feed and set to "skip perforation".

A very pleasant toolkit system, with many genuinely useful commands in its repertoire, I felt that the only shortcoming of *Q Plus* was its minimal documentation. Although covering adequately the system's essentials and in spite of the fact that the program is largely self-explanatory, many users could be newcomers to computing and more detailed instructions regarding the various facilities available, prior to getting it up and running, would be of great benefit.

Sedit PDQL £15

A PDQL/Dillon utility, *Sedit* provides a means to create and edit screen format files for use in Archive. Archive users will find *Sedit* particularly useful, if, like me, limitations imposed by

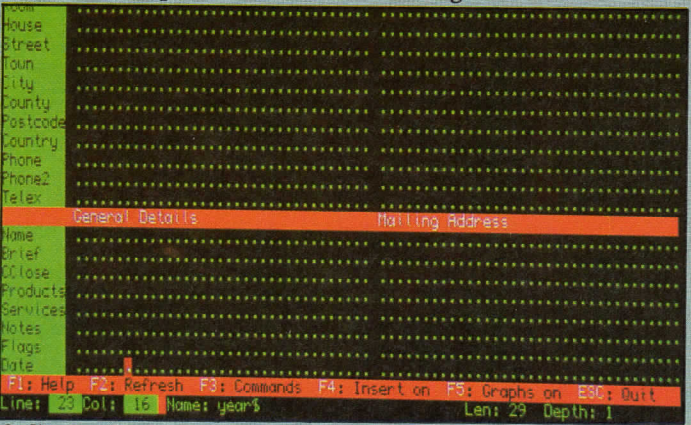
the Archive "sedit" subsystem have proved irksome.

A much-improved operating environment provides extra cursor control commands; variable fields may be amended after they have been created and text entry may be made in either 'Insert' or 'Overstrike' modes.

Paper and ink colours may be changed in text and variable fields; independently, in values of white, black, green or red, and colours may be re-assigned in any of several ways.

Archive supports a limited number of box-drawing graphics characters which can be utilised in *Sedit*. Since those characters occupy part of the text field, however, they cannot share a character position with any other character.

Sedit normally uses the full 80-column by 25-line *QL* screen format but may be changed to 64-column width. Because Archive uses a non-standard font, a 64-column display will not appear exactly as it will



Sedit. Good value.

be displayed when loaded into Archive.

The screen display is divided into four distinct zones. The upper 23 lines are defined as the main screen area and design is limited to this zone. Line 24 is a prompt line and contains information relevant to the commands available, responses — such as a file being loaded — or any additional input

required for the command selection.

The bottom line is divided into two parts; to the left is a permanent display of the row and column position of the cursor, also indicated in the current paper and ink colours. To the right, command dialogue indicates system prompts and responses, when in text mode, and the eight graphic character keys, when in graphic mode.

System commands are divided into two classes — immediate and extended commands. Cursor movement and commands tied to the function keys are immediate commands; the 12 extended commands set or control the system operating environment and include file-handling, paper or ink setting or re-colouring and alterations to variable fields.

Editing fields may be done in terms of paper or ink colours, adjusting for length of a field and either deleting existing or inserting blank lines. Any number of *_scn* files may be merged with the

current screen at the current cursor row and saved as a composite *_scn* file.

Once editing is completed, screen files produced by *SEDIT* are saved in optimal format, usually smaller than equivalent files created in Archive. Of particular importance to users of unexpanded *QLs*, memory space is saved at

run-time. Because Sedit files will be used ultimately by Archive, only the standard Archive naming convention is supported by Sedit.

If you wish to use Sedit, or any other Turbo-compiled program, such as *The Editor* within multi-taskers such as *Taskmaster*, you will need to have the Turbo toolkit loaded in addition to the Supercharge extensions used by Taskmaster. To do that, you will have to modify the Taskmaster boot slightly.

List the boot and edit the line where the Supercharge extensions are loaded with the LBYTES command, deleting the end of the line where the extensions are called. Beneath this line add:

```
_rtm = respr(5538) :
LBYTES
driveNO_TURBO_TK_
CODE,_rtm
```

Beneath that, add the following line, with a suitable line number:
CALL base:CALL
base + 704:CALL_rtm

The SEDIT manual is lucid and describes its operation in clear and unequivocal terms. Users will need to have Toolkit II available for some of the Sedit file handling requirements. Also included in the manual is a particularly good simple glossary of terms used for Archive database applications. Overall, Sedit is a very useful utility and exceptionally good value.

Information

QPlus
Sandy (U.K.) PCP,
Unit 33, Murdoch
Road,
Manton Lane,
Bedford MK41 7PQ.
Tel: 0234 219014.

Sedit
Compare
PDQL,
49 Frederick Street,
Birmingham B1 3HN.
Tel: 021 233 3042.

UTILITY FILE EXTRA

Ron Massey on how to multitask compiled programs with Taskmaster.

Further to last month's *Taskmaster* update, if you wish to add *The Editor* to start-up the front-end default program menu of Taskmaster, try the following:

Enter The Editor file name — *edt_bin*, as supplied — into the Taskmaster front-end device and name table.

Set the code space required for your application; 80000 will provide a more than adequate amount of elbow room.

Set the option for multi-tasking to "S" — for suspend.

Code-sharing to "N" — for no.

Follow the prompts for setting the screen refresh option. The Editor, in common with most multi-tasking programs, uses its own screen refresh key, <F4>. When prompted, pressing the relevant refresh key will enter the correct auto-refresh code into the menu and this code will be generated each time you switch back to The Editor.

If you wish to add other programs to Taskmaster, find if the new program has a screen refresh option. If so, use the same key for the auto-refresh option. ARK program systems such as *Archivist*, *Cardfile* and *Library File*, for example, use the letter "Z" for its screen refresh.

If no refresh key is available, you will have to use the screen-save option for the program to which you are returning.

Multi-tasking Supercharged programs with Taskmaster will share the controller's

Supercharge extensions and do not require them to be added for each Supercharged program added to Taskmaster.

If, however, you wish to add programs to Taskmaster which have been compiled with Turbo, Turbo run-time extensions should be added to the boot program and Turbo run-time extensions to the same media.

Load the Taskmaster boot and list it. About halfway down the listing, you will see the following line:

```
base = RESPR
(704 + 1506 + 10000 +
1000 + 100)
LBYTES dev$ &
'_EXTENS_cde',base :
CALL base : CALL base
+ 704
```

Make alterations to this section of the boot so that it reads:

```
base = RESPR
(704 + 1506 + 10000
+ 1000 + 100)
Tbase = RESPR (5566)
LBYTES dev$ &
'_EXTENS_cde',base
LBYTES dev$ &
'runtime_cde',Tbase
CALL base : CALL
base + 704 : CALL Tbase
```

The Editor, versions 1.12 and later, have been compiled with Turbo and adding the foregoing modifications will allow it to be used in Taskmaster with no problems.

Considering the program as an integral working unit, Taskmaster users are justifiably enthusiastic about the tremendous number of possibilities available to them. A word of caution is necessary. When the memory space is allotted for any of the programs, such as Quill,

it can produce a spill-over fill if memory is short.

A *def_tmp* file is created by Quill when the memory space allotted for Quill is near its capacity. That can occur at about 1,200 words on a standard QL, or at about 15,000 words on a fully-expanded machine.

Memory space for Quill, when used in Taskmaster, is adjustable but if too little space is allocated Quill will produce a *def_tmp* file. By allocating fewer than about 60,000 bytes for Quill, depending on QL and program versions, Quill will attempt to open a *def_tmp* file for its own program space.

While a single *def_tmp* file on a drive is acceptable, if you are running more than a single version of Quill and this occurs, the results are disastrous.

If it is not possible to allocate memory space consistent with the size of documents with which you envisage working; an alternative solution is to have two or more versions of Quill, each with its own default data device, so that *def_tmp* files are generated on drives reserved exclusively for them such as mdv, flp or RAM disc.

If using RAM discs is likely to become a requirement for Quill, users can either emulate available drives as ROM discs or use the Psion *configure_bas* program to allow RAM discs to be used as legitimate drives.

Any RAM discs likely to be required in Quill will have to be set up before they will be available. Failure to do so will, when Quill requires *def_tmp* space, either at worst lock up Quill — requiring a probable complete system re-set, causing a loss of all data currently in memory — or at best cause you to lose your document.



QL Expansion

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QDISC

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The best-selling floppy disc interface (now issue 4) is fitted with a 16K EPROM containing many 'Toolkit' extensions, and CST's new Ram Drive 2. It may be used with most 3.5" or 5.25" floppy disc drives, CST's own twin slimline double sided 80 track 3.5" units being exceptional value for money, with 720K of formatted storage per drive. The Toolkit provides a wide range of SuperBASIC commands and functions designed to improve access to the powerful facilities of the QL without the need for machine-code programming. Job control is made easier, files can be used for random access, alternative character sets can be produced, 'wild cards' can be used in file operations, etc.

Ram Drive
the fastest ever!

The Ram Drive device driver allows free memory to be used as though it were a very high speed disc, in fact the fastest such device when used with the RAM-plus. Ideally used for the storage of temporary results, or multiple screen images for animated displays, it also eases the copying of files in single disc systems. The Ram Drive can only use memory which is free, so the full advantage is only felt if the QL is equipped with additional memory. Built into QDisc 4 and Thor, the Ram Drive is also available on 3.5" and 5.25" floppy disc.



The CST RAM-plus unit expands the available memory of the QL to the limit of 640K. Using high grade 256K memory devices, this unit is the only one which offers the high performance of no wait-state operation. Housed in a rugged metal case, the RAM-plus unit has an expansion slot which duplicates the QL's, allowing any other CST peripheral to be used. Among the advantages derived from using the RAM-plus are the performance improvements of software and storage devices, and the ability to multitask several programs at once.

SCSI

CST's Interface for Rodime compatible Winchester handles up to 8 SCSI devices and is complete with floppy disc interface. Using enhanced QDISC software, it supports heirarchical directories, easing file management; with well over 1000 files being possible, this is absolutely essential. A Data Management Utility is provided which speeds up backups by only copying recently modified files.



The Q-488 provides comprehensive yet simple access to the IEEE 488 Instrument Bus for the Thor and QL. Developed with IEEE specialists Procyon Research Ltd, the Q-488 interfaces to equipment directly from SuperBASIC and other languages and provides commands for low level bus control and even built-in bus analysis.



The CST Thor is the ultimate development of the QL. Available in single and dual floppy and 20M SCSI Winchester models each with 640K RAM, parallel printer and mouse ports, battery-backed clock and separate 84 key PC-AT style keyboard, it is built into an attractive metal case with internal power supply and expansion slot for peripherals. Supplied with many unique extensions to QDOS including multitasking at a single key-stroke, enhanced screen windowing and making full use of all the keys on the full-travel keyboard, the Thor is supplied with a specially commissioned version of the Psion Xchange software suite, and a comprehensive manual. Contact CST or your local distributor for details.



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Eprom V1.19 for issue 4 QDisc	£15.00	£15.00
Thor 1F (Single floppy)	£688.85	£620.00
Thor FF (Dual floppy)	£803.85	£720.00
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Thor 20 1F (Single floppy)*	£1177.60	£1049.00
Thor 20 FF (Dual floppy)*	£1292.60	£1149.00
Thor 20 WF (Winchester + floppy)*	£2097.60	£1849.00

Available as an upgrade for existing Thor owners.
For floating point option contact CST.

Export administration	£5.00
Airmail outside Europe	£5.00

*Introductory price if ordered before June 30, 1987.
Prices are inclusive of carriage
CST reserve the right to alter prices and specifications without prior notice

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Expiry Date _____

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Thor TIMES



No. 870502

British Embassy Conference Denmark Introduces 'Thor 20'

A conference was held at the British Embassy in Copenhagen on Thursday, 26th March 1987, to introduce the new computer product range produced by two British companies, Cambridge Systems Technology (CST) and Psion Limited.

The conference was organised by Helmuth Stuvén of Danscroft who is the main distributor in Scandinavia for CST and Psion. The aim of the conference was twofold: to promote the Thor 20, the most recent computer from CST which is to be launched worldwide during May of this year and secondly to promote inter-company cooperation between Britain and Denmark.

The two British companies involved are Psion Limited in London who provide the Xchange software package sold with the Thor System and CST, based in Hertfordshire who developed the Thor 20. This unique new computer is based on the Motorola MC68020 32 bit processor — utilising the most advanced PC micro chip technology currently

available and is fully compatible with CST's current Thor System.

The evening's proceedings began with an address by Mr Peter Fluck, First Secretary of the British Embassy in Copenhagen and there followed presentations by Mr Helmuth Stuvén, proprietor of Dansoft, Mr David Elder, Marketing Manager for Psion Ltd, Mrs Marie Shortland, Marketing Manager for CST and Mr David Oliver, proprietor of CST who also presented a plaque to Dansoft on behalf of CST as recognition of the success of their collaboration.

Guests were representatives from the Danish professional and business community and included several Danish politicians as well as members of the press.

CST's own 68020 board, designed by David Oliver, was on display for the technically minded as were the original Thor Systems complete with applications software designed by Dansoft for companies such as Ritzaus and Handvaerksradet in Copenhagen. The superb applications packages captured the interest and imagination of all present when demonstrated by experts from Dansoft.

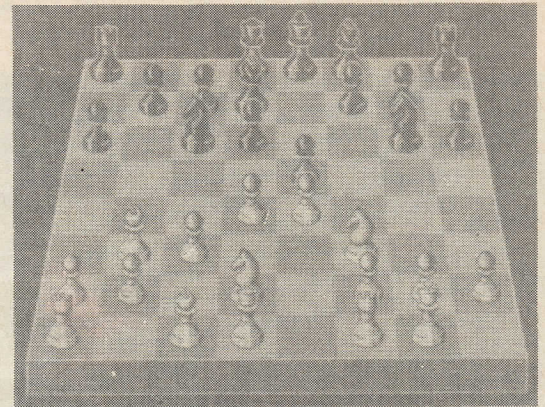
The complete success of the occasion has firmly established Denmark as CST's major European market. Similar such events are now very much under consideration for the future in other countries where CST will continue to work with local dealers to promote British computer technology.

Thor 20 Special Offer

CST have announced that they will be offering a special low-price for any Thor 20 orders placed within the next 6 weeks. The aim is to make the product available to those who might not otherwise be able to stretch to the retail price of this exciting new product. After June, which is when the offer closes, the price will rise to cover development costs which of course can be quite considerable with any new product. For further details contact CST.

Foreign Language Keyboards now Available

A variety of key tops are now available from CST for foreign language keyboards intended to correspond to foreign keyboard software. The software utilises simple Superbasic commands to select and display the desired language. Contact CST for further details.



Championship Chess

As from May, Thor users will no longer be deprived of a stimulating bout of 'chess' — with their Thor. The makers of the Thor have joined forces with Psion Ltd in London in order to bring you the first ever game for the Thor Computer System.

Championship Chess has been specially adapted for the Thor from Psion's original chess game for the Sinclair QL.

The game features animated 3-dimensional chess pieces and a comprehensive array of a analysis commands such as Hint and Take back. There are 28 levels of play from novice to champion and so will appeal to a wide range of players.

CST Championship Chess will be available from June at £24.95 inc VAT and comes complete with an instruction manual.

CST Associated Company Manufactures Drives

Due to the recent increase in Dual 3.5" Cased Floppy Drive sales, CST are forced to change their supplier. The drives will now be manufactured by CST's associated company C. V. Oliver and Sons Ltd.

The new NEC drives will be encased in attractive brushed aluminium and will be available from May. The drives have also been tested on a lower voltage range as used on the continent which will enable them to be widely distributed.

QEP III Price Change

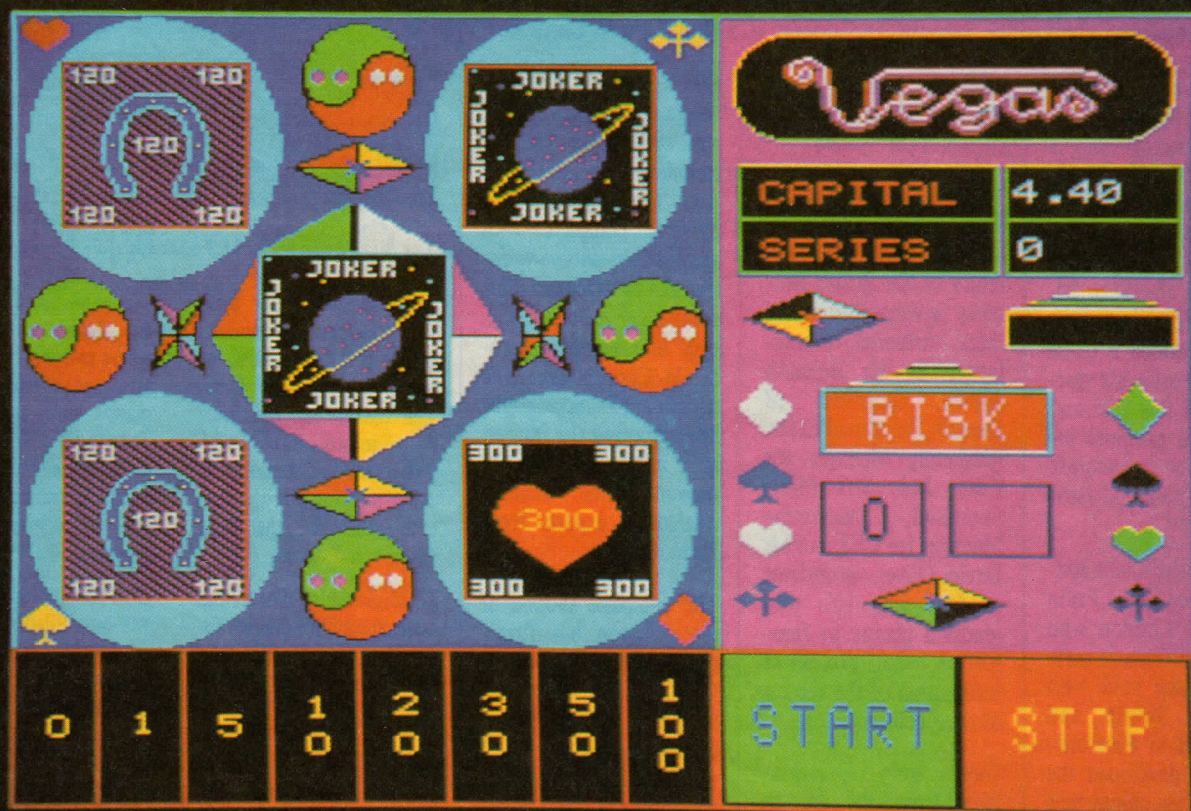
This month also sees the introduction of a new price for the CST QEP-III Eprom Programmer for the QL and Thor. The QEP-III is now available

within the UK at £129.95 inc VAT or £113.00 plus £5.00 export for overseas destinations. Outstanding orders will not be affected.

Next Month: CST Further Expand Dealer Network

SOFTWARE FILE

Mary Soens gets to have all the fun.



Vegas. If your granny is asleep, turn up the sound.

Vegas

TK Computerware
£7.77

An original release from TK Computerware, *Vegas* completes a range of casino-orientated games released by several software publishers during the last few months, all designed to entice the confirmed computer gambler or, by devious means, attract new devotees.

Preserving the tradition of the one-armed bandit,

Vegas features a five-window fruit machine display, with a complement of 13 fruit icons. Each window, in turn, achieves a rolling effect by scrolling rapidly what appears to be a random series of the icons. In the lower left corner, two flags indicate when you are allowed to STOP or re-START a cylinder spinning.

If you wait for the game to select a cylinder pause, you may have a chance to re-start the

cylinder. If you either fail to re-start the cylinder or are not offered the option, the next cylinder starts rolling until all five windows are displaying icons.

Risk options occur where, if you have fast reactions, you can win free games. A bearable range of sound effects accompanies play and, if your granny is asleep directly above the space you have set aside for your QL, you can switch off the sound.

My only criticism of *Vegas* is that instructions for keyboard participation on the first instruction screen could be made clearer. Even so, the style of play is realistic and animation is exceptionally good.

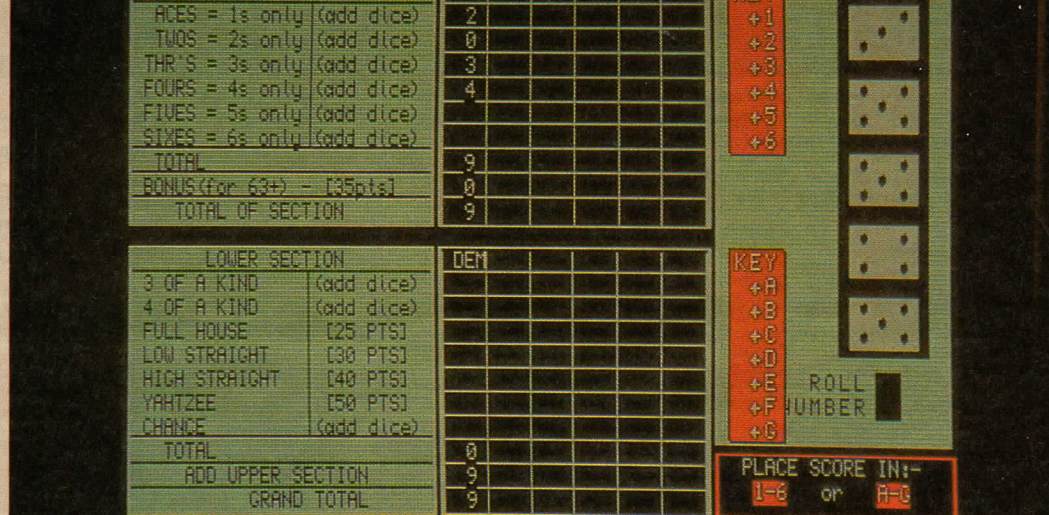
Anyone who has played a real one-arm bandit will have the feeling of *deja vu*; the atmosphere created by *Vegas* is reminiscent of a smoke-filled pub, less the hazards of upsetting your bank manager.

Yahtzee

Care Electronics
£9.20

The latest Care release, an adaptation of the classic game of *Yahtzee*, allows between two and six players to test their luck and skill in a series of one to six games. The screen dice are rolled automatically, once for each player in turn. Options of play allow players either to accept the score, entering a score in their cards, or to have a second turn. Choosing the former, following the screen prompts, the score is entered into the score card.

Electing to have a second turn, a player may roll any or all of the dice again, by selecting hold or roll as each dice in turn is shown in the prompt box.



Yahtzee. A well presented strategy game.

Each player has 13 turns in each game and at the end of each turn a box must be filled with either a score or a zero. Scores are adjusted at the end of each game; alternatively, players can save the current state of play for continuation at another time.

Scoring supports a range of special scores for

three or four of a kind, a full house, low or high straights and Yahtzee, where all five dice show the same number; each subsequent Yahtzee in the same game scores an additional 100 points.

Games for the QL tend to polarise towards one of three varieties — arcade, adventure games — which may or may not be

illustrated, as well — or games of strategy. Yahtzee is of the latter type and, while not so visually exciting as graphics-orientated games, is nonetheless well-presented and carefully thought-out. If you are keen on games of strategy, combined with elements of luck, Yahtzee is recommended.

Super Arcadia (BMX Burner)

Digital Precision
£9.95

Among classic Digital Precision games releases, *BMX Burner* — one of two games from the dynamic duo *Super Arcadia* — is a moderately fast-action, arcade-type game with a now somewhat dated theme, involving the hero of the action being transported among obstacles and hazards on a jet-propelled BMX bike.

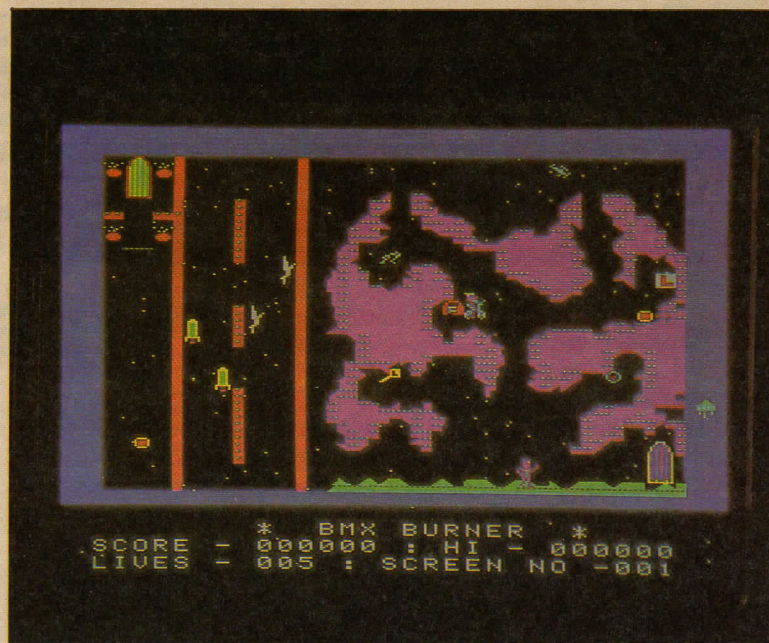
Initially you are offered the option of collecting four bombs, one at a time, from your starting position, at the same time avoiding the twinkling spot and other hazards. The bombs can be left in the paths of your enemies, effectively disposing of them for the duration of play. As each bomb is placed

strategically, you can return to your starting position for additional bombs.

Up to 40 screens are purported to be available to the player, although I failed to get beyond the first one. Sneaky villains and aliens, those.

During the course of play, you may pick up any treasures, in a particular though not readily-apparent order you happen to encounter — at least I assume they are treasures. Points are received for retrieving them and the game continues. Once the first screen is completed you go on to subsequent hazards.

While not particularly demanding, *BMX Burner* is one of those games which has a charm and addictiveness which has to be experienced to be fully appreciated. Contrary to my initial expectation, I found that I spent much more time playing it than was necessary for this review. My only surprise is that Digital Precision does not promote it more.



INFORMATION

Super Arcadia
(BMX Burner)
Digital Precision
222 The Avenue,
London E4 9SE
Tel: 01-527 5493

Vegas
TK Computerware
Stone Street, North
Stanford, Ashford,
Kent CT25 6DF.
Tel: 0303 812801

Yahtzee
Care Electronics
800 St Albans Road,
Garston, Watford
Herts WD2 6NL
Tel: 0923 672102

Author	Language	Program Name	Price	Issue	Size
1. Giles Todd	(B)	DIY Assembler	£5	Mar/Jun	120
<i>Converts Assembler source into m/c object code</i>					
2. Richard Cross	(AO)	Mini Monitor	£3	Oct	60
<i>Pocket-sized monitor with comprehensive facilities</i>					
3. A Didcock	(B)	Connect4	£1	Sept	15
<i>Pit your wits against the QL</i>					
6. Richard Cross	(MB)	Sprite Animation	£2	Apr	50
<i>A subtle blend of machine code and SuperBasic which produces a versatile sprite designer and high-speed animator</i>					
7. Steve Deary	(B)	Pacman	£1	Mar	20
<i>A reasonably fast rendition of the famous arcade favourite</i>					
9. James Lucy	(L)	Composer	£3	Oct	50
<i>Composer and play sheet music on the QL</i>					
11. P J Smith	(B)	*DIY Adventure	£1	Feb	60
<i>A skeleton framework where you have to slot in the details to create your bespoke adventure</i>					
12. R Green	(B)	Othello	£1	Aug	25
<i>A 3D version of the well-known board game Othello for one or two players</i>					
13. S J Ackers	(S)	*Touch Type	£4	Aug	80
<i>Touch-typing course — 14 lessons, on-screen keyboard, 800+ word vocabulary and WPM readout</i>					

14. Rob Sherratt	(AO)	FCOPY	£4	Mar'86	80
<i>A machine code Microdrive utility for turbocharged file copying</i>					
16. J M Dower	(B)	Mushyman	£2	Jun/Jul'86	15
<i>Mushroom munching arcade action</i>					
17. Tony Quinn	(S)	*CAD QL	£4	Sept'86	180
<i>Professional features include rubber banding and user-definable symbol library</i>					
18. Stuart Campbell	(MB)	Attack of the Things	£3	Oct'86	45
<i>Can you repulse the attacking Things?</i>					
19. Karl Jeffery	(MB)	Starport 2001	£3	Nov'86	40
<i>An authentic version of the arcade game Galaxians</i>					
20. Marcus Jeffery	(S)	QL Go	£4	Apr/May'86	40
<i>A must for strategy games enthusiasts</i>					
21. J P Hartrey	(B)	Britain	£2	Nov'86	20
<i>Improve your geography knowledge with this round Britain quiz</i>					
22. KBG Judson	(B)	Darts	£2	Dec'86	30
<i>The popular pub pastime in pixels</i>					
23. Neil Taylor	(S)	Window Designer	£2	Feb'87	40
<i>On-screen window designer</i>					
24. J. F. Tydeman	(S)	Design 3D	£4	Mar'87	200
<i>An extensive utility for the production of 3D Screen designs</i>					

ORDER FORM

No. of programs required	Total cost of programs	£
No. of drives required	Drive cost @ £2.50	£
Total sectors (max. 200 per drive)	Sub total	£
No. of drives sent	+ 15% VAT	£
Program 'ID' numbers	Postage and packing	£0.75
	Total to be sent	£

Name _____ Address _____

Please copy on to Microdrive the programs above which I have indicated with a cross. I enclose a cheque/PO to the value of £..... made payable to *Sinclair QL World*. I understand that *Sinclair QL World* undertakes to supply only these programs (copied on to Microdrive) and accepts no liability for their operation as defined by the author. Neither can *Sinclair QL World* supply additional information about any of the listings other than that originally printed. Any article reprints must be ordered separately at £2 each inclusive of post and packing (£3 overseas).

There was no shortage of readers eager to get their hands on one of the 15 copies of Taskmaster we were giving away in the February issue.

Picking the winners was not the easiest of tasks. We have included one or two of the more interesting and original suggestions on this page,

together with a list of the lucky 15 winners.

Do not worry if you were unlucky this time;

there will be plenty of competitions in future issues.

Network

I am a justices' clerk, which means that I run the office for a Magistrates' Court. I am developing a network of QLs for word processing and other applications to supplement the Burroughs Court Information System.

At present I use Choice at each station but I need a network controller. I am also seeking to develop, with Kingston Polytechnic, an emulation of the Burroughs ergonomic terminals. They would each require a job permanently running in the background

when, say, word processing on Quill, to handle network traffic, which cannot be done with Choice.

J. A. Davis,
Kingston-upon-Thames.

Research

I am involved in leukaemia research and use my QL extensively for analysis of patient data. Taskmaster would be of great use to me as it would enable me simultaneously to analyse data, draw graphs and add text, thus minimising the time spent on computing and, as a consequence, allowing me more time to generate experimental results.

Another obvious function of multi-tasking would be in the preparation of data for publication where there is a need to merge graphs text and references.

Lyn Healy,
Kingsbury,
London.

WINNERS

Lyn Healy	Kingsbury, London.
J A Davis	Kingston-upon-Thames.
Valerie Edkins	Perry Barr, Birmingham.
Martti Sarvas	Espoo, Finland.
S Rockley	Wellingborough, Northamptonshire.
Iain Scott	West Hoathley, Sussex.
G Grady	Wargrave, Merseyside.
Nazir Jussab	Norwich, Norfolk.
Colin Humberstone	Sevenoaks, Kent.
R J Field	Oundle, Peterborough.
Nicola Gandini	Verona, Italy.
Nigel Eva	Portishead, Bristol.
Graham Cook	Hailsham, East Sussex.
Jurgen Gather	Koln, West Germany.
Krzysztof Czernek	Warsaw, Poland.

ENTERPRISES

Single Dattal Disk Drive (80 Track single sided) plus Dattal Interface including comprehensive toolkit all inclusive at £140 or with box of ten 3½" disks at £159.95.			
Dual 3.5" Drives.....	£210.00	Dual Drives & CST Interface.....	£275.00
Dual Drive & 512k Interface.....	£400.00	Single Drive & CST.....	£200.00
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Sinclair QL 1 Year Service Contract and Four Free Books (JS).....	£165.00	Schon Keyboard.....	£52.95
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	(QL World Recommended)		(QL World Recommended)
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GST Macro Assembler.....	£29.95		

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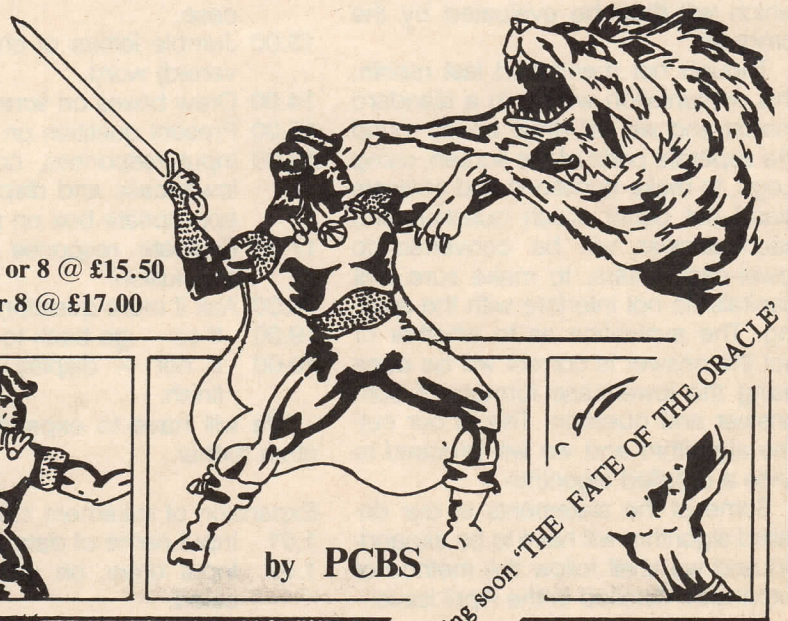
THE HEART OF GERN?

© 1987

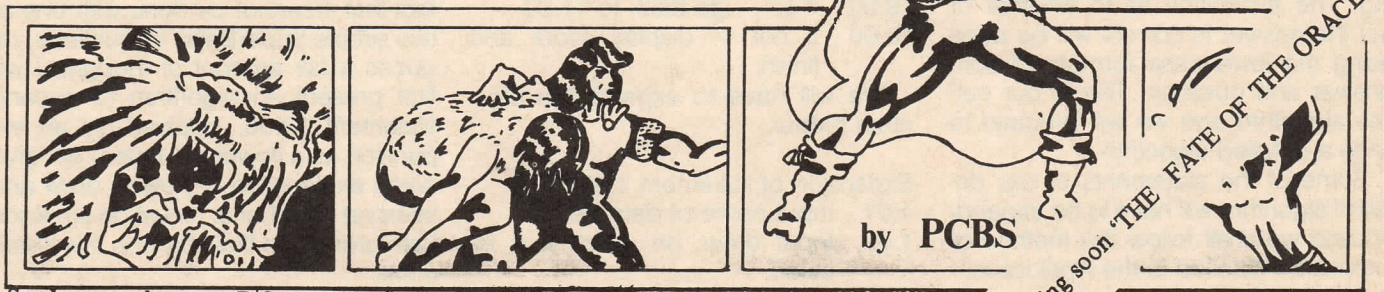
The "Heart of Gern" is the first of a challenging series of adventure games devised to test even the most battle scarred adventurer. Set in the magical fantasy world of the 'Princelands' you Tirac must continue the quest for the black jewel which imprisons the evil spirit-wolf, Gern. You must reach the Heart before the brotherhood, an evil cult of wolf worshippers whose aim is to release Gern. Hidden

away in a secret vault protected by guards, traps and magical deceptions it will take more than luck to succeed, it will take skill, determination and above all rational thinking.

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QL EDUCATION...



Leslie Fahidy completes the spelling teacher program introduced in last month's issue.

In the April issue we discussed a plan to produce a program to teach spelling. We have an approximate outline, a skeleton algorithm, which we are to use; we must, of course enlarge on that considerably before we can write the program. Now you will be given the complete program for the spelling teacher.

Having agreed on some of the main points of the logic of the program, let me sum it up for you. Data will be in data files, consisting of words and their corresponding clues, separated by the '%' sign. We will select words at random, jumble the letters and present it to the learner with a clue. The learner will have to type-in the correct spelling, which will then be evaluated by the program.

Though not mentioned last month, this presentation will be in a standard format and we will draw boxes round the separate parts of the screen, using Logo, to make questions and answers stand out better. Each question and each answer will be converted to lower-case letters, to make sure that capitals do not interfere with the spelling. The evaluation as to whether or not the answer is correct will be done using the lower-case formats of both answer and question. This is our outline algorithm and we will proceed to write a detailed algorithm.

Some of the statements of our detailed algorithm will have to be expanded and we shall follow the method of expansion detailed in the April issue.

Algorithm of spelling teacher.

- 1.00 Input name of file and drive number.
- 2.00 Open input channel.
- 3.00 Dimension variables.
- 4.00 Read number of data pairs into NUMBER.
- 5.00 In a loop, for all data pairs:
- 6.00 Read word/clue combination,
- 7.00 Split into words [word\$()] and clues [clue\$()]
- 8.00 End of loop.
- 9.00 Close input channel.
- 10.00 Set number of correct and incorrect responses to 0.
- 11.00 Select one of the words at random.
- 12.00 Convert chosen word to lower case.
- 13.00 Jumble letters of chosen (converted) word.
- 14.00 Draw boxes on screen.
- 15.00 Present question on screen.
- 16.00 Input responses, convert it to lower-case and display it in an appropriate box on screen.
- 17.00 Evaluate response and state conclusion.
- 18.00 Ask if more questions required.
- 19.00 If so — go back to 11.00
- 20.00 If not — display score and finish.

We will have to expand this algorithm further.

Expansion of statement 1.00

- 1.01 Input name of data file.
- 1.02 Input drive, on which it is located.

- 1.03 Check the previous two inputs for validity. Note that this has not been done in the listing; it is left as an exercise for you. With respect to the file name, you should check that only valid characters, and only a permitted number of them, have been used. Since we are at the early stages of the program, there is no pressing need to ensure that the file exists. If it does not, you will get an error message and you will have to run the program again. It is, of course, possible to check that the file exists. In connection with drive numbers, check that the input is numeric and that the quoted drive number exists.

Expansion of statement 2.00

- 2.01 Form the name of the data file from the file name and the drive number.
- 2.02 Open the data file for reading from it.

Statements 3 and 4 do not need further expansion. Please refer to the listing if in doubt.

Expansion of statement 5.00

NB. The number of data pairs in the file has already been read into variable: NUMBER.

- 5.01 Do NUMBER times:
- 5.02 Read text\$ from Microdrive.
- 5.03 In a further loop, controlled by i, to the length of text\$:
- 5.04 Is the i-th character a '%' sign?
- 5.05 If so — set variable: MARK = 1
- 5.06 If not — continue
- 5.07 Close further loop.
- 5.08 First i-1 characters of text\$ form the word; second half, from i+1-th character onwards, form the clue. Store them in word\$() and clue\$().
- 5.09 Finished with do-ing NUMBER of times.

Statements 6 to 11 inclusive do not require further expansion. Statement 12.00, converting to lower-case, is shown as a flowchart in figure one.

Expansion of statement 13.00

Since jumbling the characters of a word is a task which, apart from the fact that it cannot be done with one or two simple SuperBasic instructions, requires a fair amount of thought; I will first present an algorithm to expand statement 13.00, followed by an expansion as a flowchart. Later I will give some explanation of how to draw and interpret flowcharts. I must do so, since I am giving two flowcharts in this instalment.

possible formats; I have chosen the following. We will print the following information, in the lines indicated:

- a) Line 2 "Jumbled word".
- b) Line 4 The question.
- c) Line 6 "The clue is:".
- d) Line 8 The clue itself.
- e) Line 10 "Your answer:".
- f) Line 11 The answer.
- g) Line 13 "Your answer is:".
- h) Line 14 The evaluation, printed large.
- i) Line 16 (If needed) "The correct answer is:".
- j) Line 17 (If needed) the correct answer).

We will have to draw our boxes so that, when the previous text appears in the position indicated, the boxes are drawn round the words.

Statements 15 to 20 inclusive do not need to be expanded, since they may each be accomplished by one or two simple instructions in SuperBasic.

By the time we reach the stage of drawing a flowchart, we must already have decided how to accomplish the task. It is possible to write an algorithm by drawing flowcharts but that is the difficult way of doing it. You are advised to have the algorithm written, or at least thought-out, before attempting to draw a flowchart.

A flowchart consists of a number of interconnected boxes. They could be of any shape; you may even omit them. The shapes used frequently are shown in figure three.

The start/finish box has only one connection — one going to it or one coming from it. The decision box has one entry point and two exits, labelled T (for true) or F (for false). The two exits signify the two possibilities. The other boxes have one entry point and one exit. The interconnecting lines indicate the flow of the program, with the arrowheads pointing to the next action which follows.

Listing one contains the spelling teacher program. It would be advisable to check each statement in it with the corresponding part of the algorithm and/or the flowchart. You should be able to see how each statement in the algorithm, or each box in a flowchart, corresponds to at least one SuperBasic instruction.

● Next month will start to write a program to teach children to tell the time.

```

100 REMark *****
110 REMark *** Spelling teacher ****
120 REMark *****
130 CLS:CLS#0
140 INPUT"Name of datafile..":n$
150 INPUT"Which drive is it on? ":d$
160 REMark Check validity of above two inputs.
170 filename$="mdv"&d$$"&n$
180 OPEN_IN #4,filename$
190 DIM word$(1000,15),clue$(1000,50)
200 INPUT#4,number
210 FOR counter=1 TO number
220 INPUT#4,text$
230 mark=0
240 FOR i=1 TO LEN(text$)
250 IF text$(i TO i)="%" THEN mark=i
260 END FOR i
270 word$(counter)=text$(1 TO mark-1):clue$(counter)=
text$(mark+1 TO LEN(text$))
280 END FOR counter
290 CLOSE#4
300 correct=0:incorrect=0
310 REMark select one of the words
320 chosen=RND(1 TO number)
330 pointer$=word$(chosen):q$=pointer$:
convert:pointer$=q$:original$=q$
340 jumble original$:q$=jumbled$
350 convert:question$=q$:REMark upper to lower case
370 CLS:boxes:REMark draw boxes
380 AT 2,1:PRINT"Jumbled word":AT 4,1:PRINT question$
390 AT 6,1:UNDER 1:PRINT"The clue is:"
400 UNDER 0
410 AT 8,1:PRINT clue$(chosen)
420 AT 10,1:FLASH 1:PRINT"Your answer:":FLASH 0
430 AT 11,1:INPUT answer$
440 q$=answer$:convert:answer$=q$
450 AT 13,1:PRINT"Your answer is:":AT 14,1
460 IF answer$=pointer$ THEN
470 CSIZE 1,1:PRINT"CORRECT!":correct=correct+1:GO TO 490
480 ELSE CSIZE 1,1:PRINT"WRONG!":CSIZE 0,0:incorrect=incorrect
+1:AT 16,1:PRINT"The correct answer is:":AT 17,1
:PRINT pointer$
490 CSIZE 0,0
500 AT 18,1:PRINT"Do you want more questions? "
510 a$=""
520 REPEAT loop
530 a$=INKEY$
540 IF a$<>" " THEN EXIT loop
550 END REPEAT loop
560 IF a$="Y" OR a$="y" THEN GO TO 310
570 CLS:AT 10,0:PRINT"You got ";correct;" right out of ";
correct+incorrect;" questions."
580 STOP

5000 DEFINE PROCEDURE jumble
5010 jumbled$=FILL$( " ",LEN(original$))
5020 FOR counter=1 TO LEN(original$)
5030 m=RND(1 TO LEN(original$))
5040 IF jumbled$(m TO m)<>" " THEN GO TO 5030
5050 jumbled$(m TO m)=original$(counter TO counter)
5060 END FOR counter
5070 END DEFINE

6000 DEFINE PROCEDURE convert
6010 LOCAL l,a$
6020 FOR l=1 TO LEN(q$)
6030 a$=q$(l TO l)
6040 IF CODE(a$)>64 AND CODE(a$)<91 THEN a$=CHR$
(CODE(a$)+32):q$(l TO l)=a$
6050 END FOR l
6060 END DEFINE

7000 DEFINE PROCEDURE boxes
7010 PENUP:LINE 0,0
7020 TURNT0 90
7030 MOVE 92
7040 TURNT0 0
7050 PENDOWN
7060 MOVE 80
7070 TURNT0 270
7080 MOVE 18
7090 TURNT0 180
7100 MOVE 80
7110 TURNT0 90
7120 MOVE 18
7130 PENUP
7140 LINE 0,0
7150 TURNT0 90
7160 MOVE 72
7170 PENDOWN
7180 TURNT0 0
7190 MOVE 165
7200 TURNT0 270
7210 MOVE 18
7220 TURNT0 180
7230 MOVE 165
7240 TURNT0 90
7250 MOVE 18
7260 PENUP
7270 LINE 0,0
7280 TURNT0 90
7290 MOVE 50
7300 PENDOWN

7310 TURNT0 0
7320 MOVE 70
7330 TURNT0 270
7340 MOVE 15
7350 TURNT0 180
7360 MOVE 70
7370 TURNT0 90
7380 MOVE 15
7390 PENUP:LINE 0,0
7400 END DEFINE

```

Jumbling the characters of a word is not easy. In all such situations, when the method of solution is not obvious, it is a good idea to start with the assumption that we are to give instructions to a person — not a computer — on how to do the task. We assume that this person is willing and able to carry-out our instructions exactly but the instructions themselves must be precise.

How would I jumble the characters of the word: Sinclair — say? I must assume that, even though I carry-out my instructions faithfully, I am not allowed to use my powers of intelligence or observation; I must follow the instructions rigidly. No doubt one could find many different algorithms to achieve the task; I have chosen the following method:

- 13.01 The word to be jumbled — i.e. 'Sinclair' — is contained originally in the variable: original\$: it will eventually be contained, jumbled, in jumbled\$.
- 13.02 Initially, jumbled\$ consists of as many blank spaces as original\$ is long.
- 13.03 Initially, the variable: counter is the length of original\$
- 13.04 Do counter times.
- 13.05 Generate random number m, between 1 and the length of

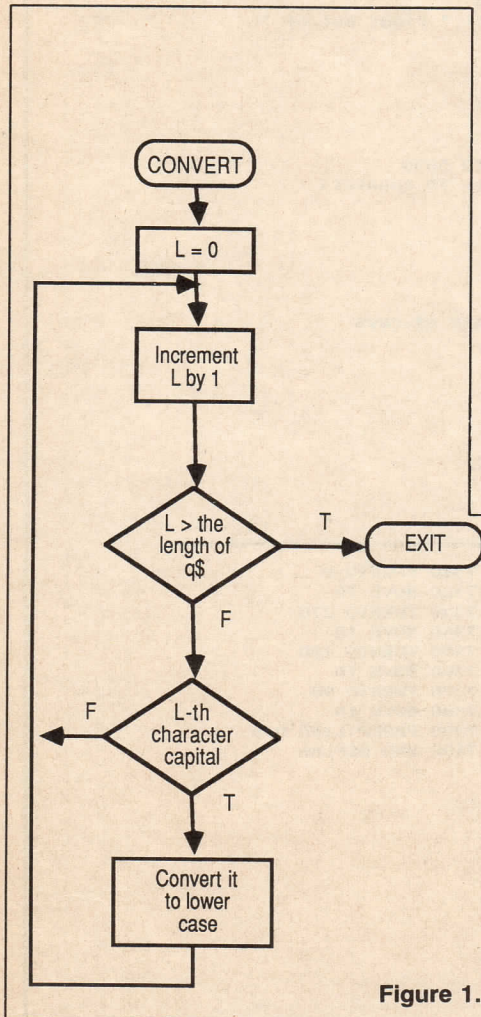


Figure 1.

- original\$
- 13.06 Is the m-th position of the jumbled\$ occupied? (It is, if it is not a blank).
- 13.07 If so — go back to 13.05, otherwise continue.
- 13.08 Copy one character, from the counter-th position of original\$ to the m-th position of jumbled\$.
- 13.09 Go back to 13.05
- 13.10 Finish doing counter times.

As an example of this algorithm, apply it to the word 'Sinclair'. Initially:

original\$ jumbled\$
Sinclair _____

Now generate a random number,

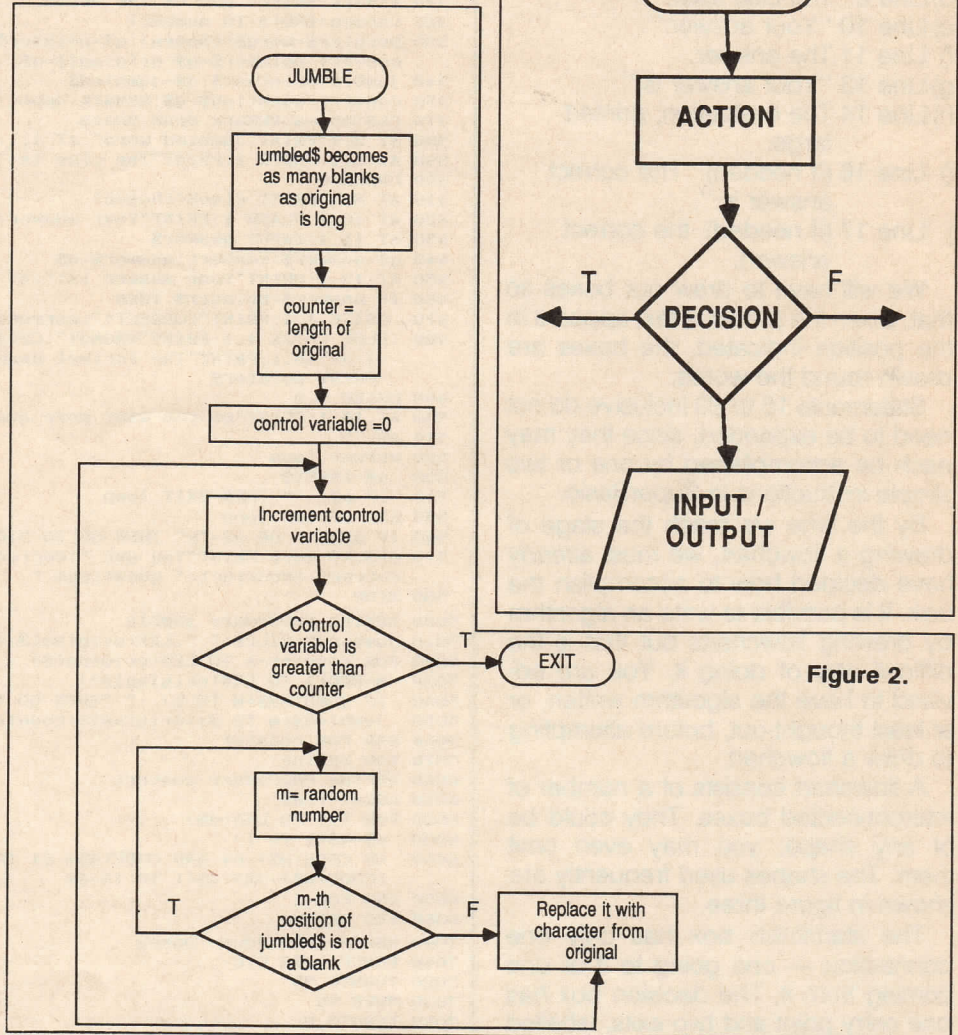


Figure 2.

say m = 5. Therefore, according to our algorithm, we test to see whether or not the fifth character of jumbled\$ is available — it is, since the fifth character is a blank. So copying the first character of original\$ to the m-th position of jumbled\$, the situation is:

original\$ jumbled\$
Sinclair _ _ _ S _

Generate a second random number, m, say m = 2. Since the second position in jumbled\$ is a blank — i.e., available —

original\$ jumbled\$
Sinclair _ i _ S _

Suppose the next random number is m = 7; then:

original\$ jumbled\$
Sinclair _ i _ S _
and so on, until the whole of original\$ has been jumbled. If, at any stage, the m-th position of jumbled\$ is not available — not a blank — we revert to the stage where we generate another value for m.

Even though the previous algorithm

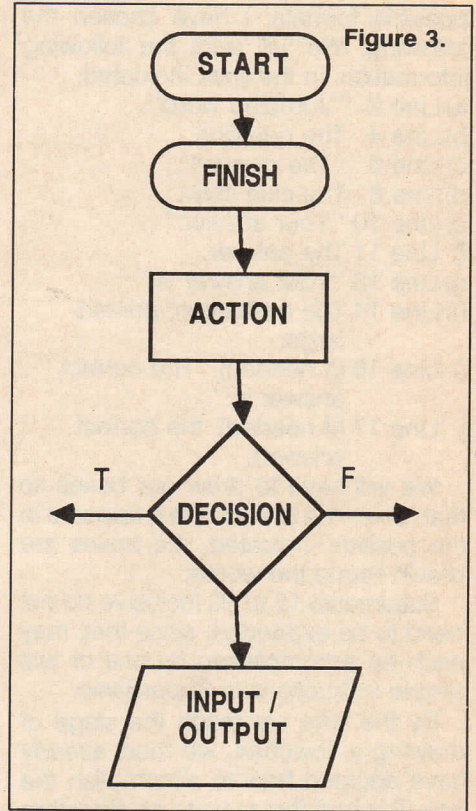


Figure 3.

should be sufficient for the writing of a program, for the benefit of those who prefer working with flowcharts a graphical version of it is shown in figure two. Once you have gained an understanding of flowcharts, you are urged to compare the listing of the procedure 'JUMBLE', in this month's listing with the flowchart, to make sure you understand how code may be written from a flowchart or an algorithm.

Expansion of statement 14.00

This step adds the icing to the cake. It looks so much neater if the display is in a standard format. We could have chosen any one of a large number of

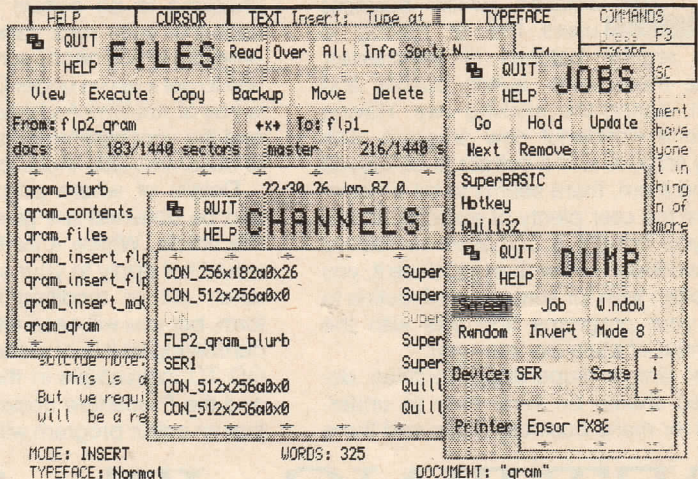
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Software Applications

QL software writers and support personnel seem strangely unaware of the irritation which business users feel at having to make regular batches of keypresses, mouse movements, button pushes and so on, during the working day. Having written a wonderful new program, with pretty screens and a pointer to be moved around them, there seems to be a desire to give the user plenty of exercise. If, like me, you bought a computer to reduce your workload rather than increase it, you may often wish for some kind of routine to load your programs and files with the minimum of attention from you.

The simple SuperBasic routines described should be fairly easy to understand for many business users and there

ible to run Supercharge and Unifile, from one of the standard QL books, with the basic set-up. I have not yet done sufficient checking to be certain that the Impact accounts suite runs satisfactorily; it is a program which needs some experimentation to get it to run under Q-Switch but that is true of run-time Archive and Editor; also and the accompanying listings show how to accommodate those programs.

Details of where proprietary routines can be obtained are given at the end of this article. Where a particular operation would not apply to your system, it can be taken out or modified to the required form, but you will need either to leave line numbering as it is or make changes to the GO TO instructions in the Select routine and the Procedure update — remember that an editor program will not change the

line numbers after GO TOs when lines are re-numbered, as SuperBasic does.

The only device used in the listings is flp1, because I prefer to have all the program files I need on the one disc, in this drive, leaving flp2 and mdv1 & 2 for data files. There is no reason why other devices should not be used if they suit your operating methods better — just substitute the appropriate device names and make sure the cartridges/discs are where the routines expect to find them.

If QFlash is used, the master cartridge has to be in mdv2 whenever the boot is run—including after a warm re-set; doing this has not so far caused any evident corruption of the Qflash cartridge on my system but I have a modified 5V supply and that may make spurious signals to the Microdrive write heads less likely than on the unmodified system.

Read the following in conjunction with listing one. The PCML interface has a Toolkit which contains SuperBasic procedures usually called extensions, which give greater operational flexibility than is provided by the Basic commands. Those extensions have to be activated and the command is <FLP_EXT:NEW>. As <NEW> normally returns you to the SuperBasic screen and ignores any instructions which follow it, you have to follow it by RUN, and both those instructions should not have line numbers. That creates a problem; you cannot type and enter unnumbered lines without the commands being executed. The choice is to type the whole routine directly into a cartridge/disc file, using a command such

GETTING IT ALL TOGETHER Part II

Bryan Davies with more advice on how to get the components of your QL system working in perfect harmony.

should not be too much difficulty in modifying them to suit system configurations different from mine. No doubt there are better ways of writing such routines, as I make no claim to be a programmer, but the main thing is that they work and save much time and annoyance.

There are far too many possible combinations of system hardware and software for it to be possible to make one routine which would work on them all but the SuperBasic lines shown work well with the following system configuration:

QL 128K/D14/JM with PCML external 256K disc interface and MP 256K internal piggy-back board. Dual one-third-height Mitsubishi 3½in. DSDD disc drives. Kaga Taxan KP 810 Canon PW1080A — DMP printer. Miracle Systems serial/parallel converter. ICE desk-top ROM with mouse. Q-Switch program-switching routine. Key define key macros routine. Icicle icon macros routine. QFlash dynamic RAM-disc routine. There are also various files of SuperBasic extensions — details later.

The items listed are connected or installed virtually all the time; other items which are used in conjunction with them on most days of the week are the Psion quartet, Qspell and Editor. It is also poss-

Listing 1.

```
FLP_EXT:NEW
FLP_DPT 2,35,80
RUN
4 REMark 18-2-87:Interface commands/Disc access parameters/Black screen/Fast
  reset/Qflash/SuperBasic extensions/ICE pointer speed max. & screen pink
5 REMark Key repetition rate max. & delay min./Start & Menu/Update clock &
  calendar/Select
6 BEEP 5000,5:PAUSE 20:BEEP 5000,5:windows:AT 5,0:CSIZE 1,1:INK 235:PRINT
  "Is KEY in mdv2?":PAUSE 100:INK 23:PRINT "Loading SuperBasic extensions.."
7 LET a=RESPR(162):LBYTES flp1_warmset_obj,a:CALL a
8 LET s=RESPR(1536):LBYTES flp1_ram_disk_bin,s:CALL s:
  LBYTES flp1_toolkit_bin,s+258:CALL s+258
9 extensions
10 _icebase=PEEK_L(164068):_ptrspeed=_icebase+444:POKE _ptrspeed,8:
  _icecolour=_icebase+446:POKE _icecolour,235:POKE_W 163982,1:POKE_W 163980,7
11 QL:menu:update
12 REMark Select programme-set from menu
13 a=CODE(INKEY*(-1))
14 SElect ON a
15 =48:leave:Ice
16 =56:leave:LRUN flp1_QuArEd
17 =55:leave:LRUN flp1_QuEd
18 =53:leave:LRUN flp1_tQu
19 =49:leave:LRUN flp1_QuAr
20 =50:leave:LRUN flp1_sAb
21 =51:leave:LRUN flp1_aPSION
22 =52:leave:LRUN flp1_ofQu
23 =54:leave:LRUN flp1_orQu
24 =57:leave:LRUN flp1_Unifile
25 =REMAINDER:GO TO 13
26 END SElect
27 DEFine PROCedure windows
28 FOR windo=0,1,2:PAPER #windo,0:CLS #windo:BORDER #windo,1,0
29 END DEFine
30 DEFine PROCedure extensions
31 LET a=RESPR(5980)
```



```

32 LBYTES flp1_files_code,a+5354:CALL a+5354
33 LBYTES flp1_exten_code,a+5020:CALL a+5020
34 LBYTES flp1_job_code,a+4614:CALL a+4614
35 LBYTES flp1_xtras,a:CALL a
36 END DEFine
37 DEFine PROCedure menu
38 WINDOW 512,256,0,0:PAPER 0:CLS
39 WINDOW 333,256,180,0:PAPER 2:BORDER 1,4:CLS
40 CSIZE 1,0:INK 7:AT 1,1:PRINT"0 = ICE desktop":AT 3,1:PRINT "1 = Quill +
Archive"
41 AT 5,1:PRINT"2 = Abacus x 6":AT 7,1:PRINT "3 = Quill + Archive + Easel +
Abacus"
42 AT 9,1:PRINT "4 = Quill":AT 11,1:PRINT "5 = Quill x 2"
43 AT 13,1:PRINT "6 = Quill (data in ram2)":AT 15,1:PRINT "7 = Quill +
Editor"
44 AT 17,1:PRINT "8 = Quill + Archive + Editor":AT 19,1:PRINT "9 = Unifile"
45 screen 1,184,28,215,210,4:INK 2:write 1,"Qspell: change discs, key
CTRL+ALT+7 and F1"
46 screen 1,40,28,381,5,223:INK 2:CSIZE 2,1:write 1,"QL"
47 screen 1,78,28,413,27,238:INK 0:CSIZE 2,1:write 1,"B.F.D"
48 END DEFine
49 DEFine PROCedure screen (chan,wide,high,x,y,col)
50 WINDOW#chan,wide,high,x+8,y+4:PAPER#chan,0:CLS#chan
51 WINDOW#chan,wide,high,x,y:PAPER#chan,col:CLS#chan
52 BORDER#chan,1,0:BORDER#chan,4
53 END DEFine screen
54 DEFine PROCedure write (chan,string%)
55 LOCAL gap
56 gap = ' ' INSTR string%
57 IF gap
58 PRINT#chan;!string%(1 TO gap-1):write chan,string%(gap+1 TO)
59 ELSE
60 PRINT#chan;!string%
61 END IF
62 END DEFine write
63 DEFine PROCedure update
64 INK 0:screen 1,145,38,340,86,20
65 CSIZE 1,0:write 1,DATE%
66 REMark CLeAr keyboard buffer
67 buff=PEEK_L(163916):POKE_L buff+12,PEEK_L(buff+8)
68 write 1,"Is this correct?"
69 LET A%=INKEY%(-1)
70 IF A%="Y" THEN GO TO 104:END IF
71 LET a=1987
72 CLS:write 1,"If not:"
73 CLS:write 1,"MONTH?":getnumber:CLS
74 IF validflag$="T"
75 LET b=num
76 IF b<1 OR b>12 THEN GO TO 73
77 ELSE
78 GO TO 73
79 END IF
80 CLS:write 1,"DAY?":getnumber:CLS
81 IF validflag$="T"
82 LET x=num
83 IF x>31 OR x<1 OR b=2 AND x>28 OR b=4 AND x>30 OR b=6 AND x>30 OR b=9
AND x>30 OR b=11 AND x>30 THEN GO TO 80
84 ELSE
85 GO TO 80
86 END IF
87 CLS:write 1,"HOUR?":getnumber:CLS
88 IF validflag$="T"
89 LET D=num
90 IF D<0 OR D>23 THEN GO TO 87:END IF
91 ELSE
92 GO TO 87
93 END IF
94 CLS:write 1,"MINUTE?":getnumber:CLS
95 IF validflag$="T"
96 LET E=num
97 IF E>59 OR E<0 THEN GO TO 94
98 ELSE
99 GO TO 94
100 END IF
101 LET F=30
102 SDATE a,b,x,D,E,F:CLS
103 INK 0:PAPER 2:CLS:CSIZE 1,0:write 1,DATE%:PAUSE 50:CLS:
104 CLS:PAPER 23:CSIZE 3,1:write 1,"E":PAUSE 5:write 1,"NE":PAUSE 5:write 1,
"INE":PAUSE 5:write 1,"TINE":PAUSE 5:write 1,"UTINE":PAUSE 5:write 1,
"OUTINE":PAUSE 5:write 1,"ROUTINE":PAUSE 5:write 1,"ROUTINE?"
105 END DEFine update
106 DEFine PROCedure getnumber
107 LET validflag$="F"
108 INPUT num%
109 IF num%="0"
110 LET num=0
111 LET validflag$="T"
112 ELSE

```

Continued next month.

as <FOP_IN> — usually in a Toolkit — or to type it in as text using an editor program. I have found Editor invaluable for this procedure.

The Sandy interface uses the instruction <TK2_EXT>, which does not require a <NEW> to follow it. The <FLP_OPT> instruction sandwiched between the two just mentioned may be of use to you, but it is worth considering. The speed at which disc drives start up varies considerably and you may have an interface which is set to match drives different from the one you have; the line given applies to the PCML interface and there is an equivalent version, split into three instructions, in the Sandy interface.

The three parameters in the instruction set the security level — leave that at 2, which should be the default anyway — access time and tracks. Tracks is what you would expect and will be 40 for older drives, usually 80 for later ones. Access time has a default value of 30 for PCNL and Sandy, equivalent to a time of 0.6 seconds; modern one-third-height drives are faster and can take a value down to 13, whereas old drives may need 60 or more; a value above 90 may cause trouble.

If your drives both make plenty of hammer drill noise when starting up, the access time may need changing; otherwise, leave it alone. On Medic interfaces, the access times are fixed in the firmware and you have to look for a later version of that to overcome drive noise; I believe version 1.16 or 1.18 is required.

All the lines after the initial three unnumbered ones must have numbers; do not omit numbers from here, or parts of your routine will be ignored. As a memory aid, the first two of these lines give a list of the functions in the boot, in order of listing. I make so many changes that I put the date first as a memory jogger.

To avoid having to look at the SB screen for a minute or so, the next line causes "Loading SuperBasic extensions.." to be written to it, after it has been made completely black by the Procedure "windows". If QFlash is used, the <BEEP> instruction and the message "Is KEY in mdv2?" give just about enough time to insert the cartridge if you have forgotten to do so. It is interesting to note that the four-colour monitor mode allows many more colours, nominally 255, and two of them are used for these messages, just for variety.

It is necessary to load files next, which go into reserved procedure space before taking other actions. In this example, the first file loaded is called "warmset_obj" and provides a very useful routine to allow the QL to be re-set without it taking time to check all 640K of memory every time. The F1/F2 screen appears almost immediately after the re-set; to cause a re-set, you key CTRL + ALT + 7, which would cause the QL to lock up if this routine were not installed. Hold down the ALT key for a time, then press F1/F2.

Continued next month

Enhancing some of the QL editing commands was the subject last month but the editing environment is more than the keywords needed to write, amend and display listings; the arrangement of the screen and the provision of utilities are also important. This month's article is devoted to three file routines designed to make programming easier.

File access is relatively straightforward on the QL compared to most computers. Microdrives are far superior to tape cassettes for file storage

Listing 1.

```
100 DEFine PROCedure view
105 LOCAL f$, line$, loop
110 INPUT#0; "VIEW mdv"; f$
115 f$ = "mdv" &f$
120 OPEN_IN#3, f$: CLS#2
125 REPEAT loop
130 IF EOF(#3): EXIT loop
135 IF KEYROW(1) = 8
140 PRINT#2, "...incomplete": EXIT loop
145 END IF
150 INPUT#3, line$: PRINT#2, line$
155 END REPEAT loop
160 CLOSE#3
165 END DEFine view
```

because they are faster and they act as if they are random access devices. To display a directory listing of a 15-minute tape cassette would take 15 minutes but a Microdrive directory listing would take about seven seconds and a 720K disc directory takes about three seconds.

SuperBasic file commands take full advantage of the facilities offered by Microdrives but they are for very general use — only *SAVE* and *DELETE* are close to qualifying as pure editing commands. A few user-defined procedures therefore are needed to tailor these commands to the needs of the program writer. As with last month's utilities, they should be typed-in, tested, stored in a dedicated file and then re-numbered with high line numbers so that they can be merged with programs being developed.

BETTER BASIC

Three file routines for easier programming provided by Mike Lloyd.

It is frequently useful to copy the contents of a file to the screen to see what the file contains. As with editing commands such as *LIST*, a useful facility is marred by the verbose SuperBasic

typing and improves the display of copied files.

The user enters the procedure name, *VIEW*, as a direct command and a prompt appears asking for a file name. The prompt provides the first three letters of the device name and the user is expected to add a drive number, an underline and the file name.

Regrettably, without a toolkit there can be no proper error-trapping.

The routine continues by opening a channel to the named file and clearing the listing window. Incidentally, it is

the file in turn. Two conditions can cause the loop to be abandoned. The first is when the file is empty and the second is if the user presses the ESC key. Before one of those conditions occurs, the routine reads the file contents a line at a time and prints them to the listings window. On some early QLs the *INPUT* command cannot accept a line longer than 180 characters. There is no cure for this other than to avoid writing very long program lines.

The routine at listing two requires the user to type-in the procedure name, *CAT*, followed by the drive number. This is normally 1 or 2 but could be up to 8 if Spectrum Microdrives are added to the QL Microdrive port.

A channel is opened to a new file on the chosen drive to receive the directory listing. The directory is printed to the channel and then the channel is closed. Once again, the listings window is cleared in preparation

command necessary to implement it. Here is a typical example:

COPY MDV1_FILE TO SCR_

The resulting display is as unwelcome as the command is cumbersome. Qdos opens a default screen slightly smaller than the TV mode main window in which to print the file contents. It is possible to specify the window co-ordinates by extending the *COPY* command, as in this example:

COPY MDV1FILE TO SCR_200x200a0x0

It is debatable whether the improved display is worth the extra typing involved. The character options are always the smallest allowable size with green type on a black background.

Listing two is a procedure which reduces

Listing 2.

```
200 DEFine PROCedure cat (drive)
205 LOCAL d$, line$, loop, x
210 d$ = "mdv" &drive &"_"
215 OPEN_NEW#3, d$ &"cat_dat"
220 DIR#3, d$: CLOSE#3: CLS#2
225 OPEN_IN#3, d$ &"cat_dat"
230 INPUT#3, line$: PRINT#2, "CATALOG ";line$
235 REPEAT loop
240 FOR x = 1 TO 18
245 INPUT#3, line$: PRINT#2, line$
250 IF EOF(#3): EXIT loop
255 IF KEYROW(1) = 8: EXIT loop
260 END FOR x
265 PRINT#2, "More >": PAUSE
270 AT#2, 2,0:CLS#2, 3:CLS#2, 2
275 END REPEAT loop
280 CLOSE#3: DELETE d$ &"cat_dat"
285 END DEFine cat
```

a sensible idea to keep the default settings of the listings window unaltered so that program lines can always be displayed clearly. It is therefore logical to direct all listings, including the copying of file contents, to Window #2 rather than the main window, which might be an unsuitable size or have unusual colour attributes.

The routine enters a loop to read each line of

for display of the procedure. Despite the fact that a directory listing is considered as output and therefore defaults to the Window #1, it is more helpful and logical if directories are printed in the listings window.

The problem lies with the concepts used when designing the QL display. If Window #2 had been designated as a *system window* than merely a

KEYWORD OF THE MONTH

The *OPEN* command opens a channel to a device and allows information to be sent to or read from the device. The concepts of devices and channels are somewhat mysterious to many QL users and so a brief explanation may help.

A device might be a screen window, a Microdrive, a floppy disc, a printer, or any peripheral attached to the QL. Qdos treats all devices identically so that the process of printing information to a Microdrive file, a screen window and the printer, for example, is the same.

The means by which information is transferred to or from a device is called a channel.

Channels are identified by a number and are each linked to a specified device. The channel number can be referred to by device-specific commands, e.g., *PAPER* and *CIRCLE*, to identify where something is to happen, but these commands so not use the channel and if directed to an inappropriate device, such as a printer, they would cause an error.

It is worthwhile keeping the number of channels opened to a minimum.

OPEN commands must always specify a channel

number. What follows is a device name and, usually, some information to tailor the device to specific requirements.

The concepts section of the QL User Guide gives examples of *OPEN* statements. It should be noted that device definitions must be valid SuperBasic names and therefore do not use commas or separators.

There are additional commands for Microdrive and disc files.

OPEN_NEW is used to open a new file.

OPEN_IN opens an existing file and allows it to be read but not written to. *OPEN* allows an existing file to be read or written to. Writing to an

existing Microdrive file is fraught with danger, as existing information can be over-written accidentally.

Information is moved to a device using *PRINT* or its derivatives — *LIST* and *DIR*. Information is received from a device using *INPUT* or *INKEY\$*. Listings two and three in the main article demonstrate how channels are opened to files. Note how the end of a file is detected by the function *EOF*. Channels are closed by the *CLOSE* command, which must specify the channel number. Once closed, they can be re-defined to link them to another device.

listing window it would have followed logically that it would be where directory listings, error messages and the results of *COPY* commands would appear.

Returning to the procedure, it continues by re-opening the newly-created directory file and extracting from it the first line of information, the name of the cartridge. That is printed on the first line in the listings window and, together with the sector information, remains visible throughout the process.

Most directory listing routines try to put all the file names on the screen at once but that approach is often unsuitable. Other information may be over-written, window attributes changed unnecessarily and, especially with discs, the information may still not fit on one screen. *CAT* assumes that the listings window is unchanged from its default setting and prints the file names in pages of 17 entries at a time. The remaining three lines in the window are

occupied by the cartridge information and by the "More" prompt at the bottom of the screen.

The loop can be left either because the process is complete or because the ESC key has been pressed. In either case, the channel to the directory file is closed and the file deleted.

In some circumstances

a number of files, or perhaps every file on a cartridge, need to be transferred from one cartridge to another. The third listing assumes that source files are in Drive # 1 and files are to be copied to a cartridge in Drive # 2. As each file name is displayed the user is given the option to copy it, ignore it or quit

the routine. The procedure is accessed by entering its name, *CLONE*, as a direct command. Once more, it follows the convention that Window # 2 is the system window.

The routine begins by transferring a copy of the Microdrive directory to an ordinary file where it can be manipulated. Each file name is read in turn, the options displayed and the keyboard polled for the user's decision. If the Y key is pressed the file is copied to Drive # 2 and if the N key is pressed the file is ignored. The procedure is left if all files have been considered or if the Q key is pressed.

No doubt other SuperBasic keywords are ripe for replacement by user-defined routines and new utilities can be thought of to make programming less of a chore. An obvious addition to these routines would be the replacement *SAVE* routine listing in the September, 1986 edition of *Better Basic*. Later in the series, more sophisticated editing utilities will be explained.

Listing 3.

```
300 DEFine PROCedure clone
302 LOCal loop, getkey, file$, key
304 CLS#0: PRINT#0; "Ensure source file in MDV1_"
306 PRINT#0; "and blank cartridge in MDV2_"
308 PRINT#0; "Press SPACE to clone or ESC to quit"
310 REPeat getkey
312   key = CODE(INKEY$)
314   SElect ON key
316     = 27: RETurn
318     = 32: CLS#0: CLS#2: EXIT getkey
320   END SElect
322 END REPeat getkey
324 OPEN_NEW#3, mdv1_dir_dat: DIR#3, mdv1_
326 CLOSE#3: OPEN_IN#3, mdv1_dir_dat
328 INPUT#3, file$, file$
330 REPeat loop
332   IF EOF(#3): EXIT loop
334   INPUT#3, file$
336   PRINT#2, "Copy"!!file$!!"Y-N-Q?"
338   REPeat getkey
340     key = CODE(INKEY$( -1))
342     SElect ON key
344       = 89, 121:
346         PRINT#2; "Copying"!!file$!!"..."
348         COPY "mdv1_"&file$ TO "mdv2_"&file$
350     EXIT getkey
352       = 78, 110: EXIT getkey
354       = 81, 113: EXIT loop
356   END SElect
358 END REPeat getkey
360 END REPeat loop
362 CLOSE#3: DELETE mdv1_dir_dat
364 END DEFine clone
```

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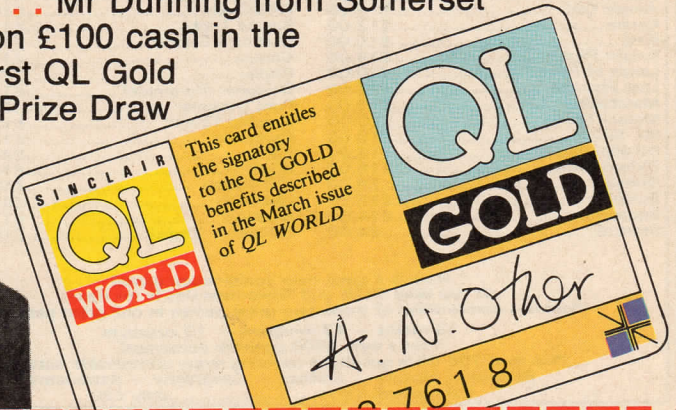
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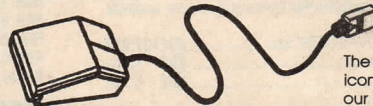
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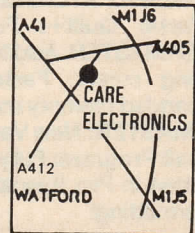
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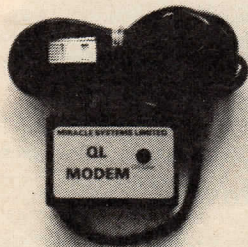
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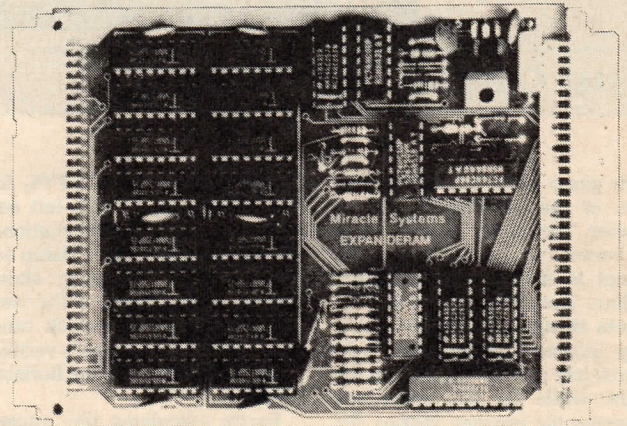


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Star Cruiser

Fraser Harkins

This game is an interesting version of the old favourite *Moon Lander*. The cursor keys are used to control your craft as you attempt to land it on the planet below. The down arrow key reduces thrust and the up arrow key increases thrust. The right arrow key rotates the craft to the right, while the left arrow key reverses the process. Hitting the space bar aborts the mission.

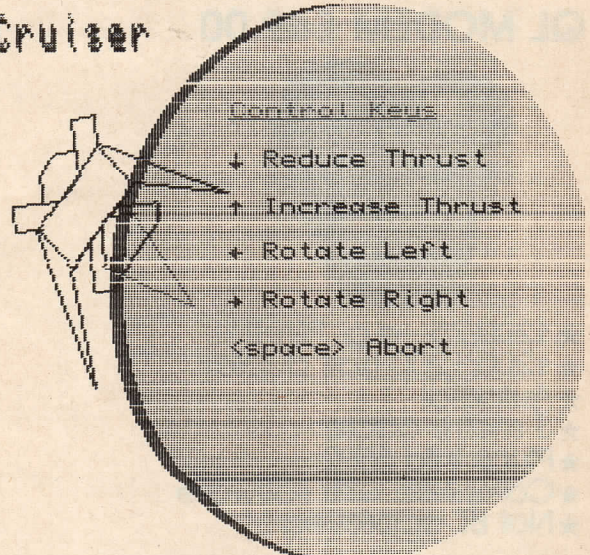
The high score procedure is contained in lines 1050-1150, while the main repeat loop for the game is in lines 1160-1300. The initialisation procedure in lines 1310-1460 is followed by the landing procedure in lines 1470-2780.

Important variables contained

in the listing include KEYS\$, for control keys up, down, left and right, Acc for the gravitational pull of the planet, and Hship for the height of the ship above ground zero. DATE\$ is the variable for the system clock function, Vspeed is the craft's vertical speed and Hspeed is the horizontal speed.

Fuel% calculates the unused fuel still available for thrust while Ro% is responsible for the rotational direction of the cruiser. Base is used to determine which base is to be landed on and Score calculates your score so far in the game. Extra% is the variable which decides how many points are scored for a successful landing.

StarCruiser



```

1000 Remark *****
1010 Remark * PROGRAMMER:      Fraser Harkins      *
1020 Remark * PROGRAM NAME:    StarCruiser        *
1030 Remark * HIGHSCORE FILE:   HighScore_StarCruiser *
1040 Remark *****
1050 Define PROCEDURE Highscore
1060 DELETE mdv1_Highscore_StarCruiser
1070 OPEN_NEW`6;mdv1_Highscore_StarCruiser
1080 FOR I=1 TO 10:PRINT`6;1000*(11-I)\'\'Fraser Harkins\'\'00:00:00"
1090 CLOSE`6
1100 END Define
1110 DIM sc$(10,3,15)
1120 OPEN_IN`6;mdv1_Highscore_StarCruiser
1130 FOR I=1 TO 10:INPUT`6;sc$(I,1),sc$(I,2),sc$(I,3)
1140 CLOSE`6
1150 MODE 4:HighscoreTable
1160 REPEAT RGB_color
1170   OPEN`1;con_432x207a32x16:PAPER 0
1180   OPEN`2;con_512x256a0x0 :PAPER`2;0
1190   OPEN`3;con_432x10a32x223:PAPER`3;4
1200   OPEN`4;con_432x10a32x234:PAPER`4;2
1210   MODE 8
1220   Ba=246608
1230   Address=Ba
1240   Score=-1
1250   Fuel%=1000
1260   INK 7:AT 10,3:INPUT"Please ENTER your name ";M$:CLS
1270   Initialise
1280   SDATE 1986,6,23,0,0,0
1290   LunarLander
1300 END REPEAT RGB_color
1310 Define PROCEDURE Initialise
1320   Off%=RND(10)
1330   IF Score=-1 THEN Intro:Score=0
    
```



```

1340 Address=Ba
1350 Count%=96
1360 Thrust=0 : abort=1
1370 Vspeed=0
1380 Hspeed=0
1390 Ro%=270
1400 Altitude%=2000
1410 ZX=0:MODE 4:Landing:Terrain:CLS
1420 Hship=200+Ra*100:Horiz=5:PENDOWN:INK'3;0:INK'4;0
1430 PRINT'4;" Score: ";:IF Score<=0:PRINT'4;"00000";:ELSE PRINT
'4;Score;
1440 PRINT'4;TO 18;"Time:";TO 45;"HSpeed:";TO 61;"Gra: ";Acc
1450 PRINT'3;" Height:";TO 20;"Base:";TO 35;"Thrust";TO 45;"Vspeed:";
TO 61;"Fuel:";INK'3;7:INK'4;7
1460 END Define
1470 DEFine PROCedure LunarLander
1480 REPEat Game
1490 Ta#=DATE$:AT'4;0,24:PRINT'4;Ta$(13 TO 20):Th=Thrust
1500 INK 7:POINT Horiz,Hship:TURNT0 Ro%
1510 MOVE 5:TURN 135:MOVE 7:TURN 90
1520 MOVE 7:TURN 135:MOVE 7:TURN -45:MOVE 2
1530 TURN -135:MOVE 7:TURN -135:MOVE 2
1540 IF Th<>0:TURN -110-Th/1.1:MOVE Th:TURN 130+Th*1.8:MOVE Th
1550 OldX=Horiz:OldY=Hship:OldDeg=Ro%
1560 BefX=Altitude%:BfsX=Count%
1570 SELEct Hship
1580 =651 TO 1300:Altitude%=1320:Count%=192
1590 =331 TO 650:Altitude%=670:Count%=96
1600 =151 TO 330:Altitude%=350 :Count%=48
1610 =71 TO 150:Altitude%=170 :Count%=24
1620 =50 TO 70 :Altitude%=90 :Count%=12
1630 =1 TO 49 :Altitude%=70 :Count%=6
1640 END SELEct
1650 AT'4;0,36
1660 IF ZX=0 THEN
1670 KEY#=INKEY$(2)
1680 IF Thrust>=20 THEN PRINT'4;" MAX ":Thrust=20
1690 IF Thrust<=0 THEN PRINT'4;" MIN ":Thrust=0
1700 END IF
1710 IF Thrust>9E-28&&Thrust<20&&Fuel%>0:PRINT'4;" ";INT(Thrust*10);" "
1720 IF CODE(KEY#)=208 THEN Thrust=Thrust+.1:GO TO 1650
1730 IF CODE(KEY#)=216 THEN Thrust=Thrust-.1:GO TO 1650
1740 IF CODE(KEY#)=32&&ZX=0&&Fuel%>0 THEN
1750 abort=2:Thrust=20:Ro%=0:ZX=1:K=-1:Hspeed=0:drift=0
1760 AT'4;0,36:FLASH'4;1:PRINT'4;"ABORT":FLASH'4;0
1770 END IF
1780 IF ZX THEN ZX=ZX+1
1790 IF ZX=4:Thrust=0:ZX=0:abort=1:AT'4;0,36:PRINT'4;" MIN "
1800 IF CODE(KEY#)=200 THEN Ro%=Ro%-45
1810 IF CODE(KEY#)=192 THEN Ro%=Ro%+45
1820 IF ABS(Ro%)>=360 THEN Ro%=0
1830 ShipAddress=INT(Address+INT(Horiz/10))
1840 IF ShipAddress>=Ba+192:ShipAddress=Ba+ShipAddress-(Ba+192)
1850 IF ShipAddress<Ba:ShipAddress=(Ba+192)-(Ba-ShipAddress)
1860 Fb=INT(Horiz-INT(Horiz/10)*10)
1870 Fa=(PEEK(ShipAddress)-PEEK(ShipAddress+1))/10
1880 IF Hship<PEEK(ShipAddress)-Fa*Fb:End_Of_Game:GO TO 1490
1890 FC=Fuel%:Fuel%=Fuel%-Thrust*abort^2
1900 IF Fuel%<=0 THEN Thrust=FC:Fuel%=0:IF CODE(KEY#)=27:RUN:END IF
:END IF
1910 U=Vspeed:W=1
1920 IF Ro%>180:T=(Ro%-360)/45
1930 IF (Ro%>=0&&Ro%<=180)!!(Ro%<=0&&Ro%>=-180):T=Ro%/45
1940 IF Ro%<=-180:T=(Ro%+360)/45
1950 SELEct ON T
1960 =0 :drift=0:K=-1
1970 =-1 :drift=.25:K=-1
1980 =-2 :drift=.25:W=0
1990 =-3 :drift=.25:K=1
2000 =4 :drift=0:K=1
2010 =3 :drift=-.25:K=1
2020 =2 :drift=-.25:W=0
2030 =1 :drift=-.25:K=-1
2040 END SELEct

```

```

2050 IF W=0 THEN
2060   Vspeed=Vspeed+Acc*.3
2070 ELSE Thrust=K*Thrust
2080   Vspeed=Vspeed+Acc*.3+Thrust*abort
2090 END IF
2100 Hspeed=Hspeed+drift*ABS (Thrust*abort)
2110 Horiz=Horiz+Hspeed
2120 Dist=U*.3+(Acc/2)*9E-2
2130 Hship=Hship-Dist:Thrust=ABS (Thrust)
2140 AT'3;0,53:PRINT'3;INT (Vspeed*10);" "
2150 AT'4;0,52:PRINT'4;INT (Hspeed*100);" "
2160 AT'3;0,67:PRINT'3;Fuel%:" "
2170 IF Horiz/10>Bfs% THEN
2180   Horiz=Horiz-(Count%/2)*10
2190   Address=Address+Count%/2
2200   IF Address>Ba+192 THEN Address=Ba+Address-(Ba+192)
2210   Display Address,Count%
2220 END IF
2230 IF Horiz<0 THEN
2240   Address=Address-Count%/2
2250   Horiz=Horiz+(Count%/2)*10
2260   IF Address<Ba THEN Address=(Ba+192)-(Ba-Address)
2270   Display Address,Count%
2280 END IF
2290 IF Bef%<>Altitude% THEN
2300   IF Horiz/10>Bfs%/2 THEN
2310     Address=Address+Bfs%/2
2320     Horiz=Horiz-(Bfs%/2)*10
2330     IF Address>Ba+192 THEN Address=Ba+Address-(Ba+192)
2340   END IF
2350   SCALE Altitude%,0,-5:Display Address,Count%
2360 END IF
2370 IF (ShipAddress-BaseAddress)*10=0 THEN
2380   K=INT (ABS (Horiz-INT (Horiz/10)*10-5))
2390 ELSE
2400   K=ABS ((ShipAddress-BaseAddress)*10)+5
2410 END IF
2420 AT'3;0,9:Height=INT (INT (Hship)-PEEK (ShipAddress)+Fa*Fb)
2430 PRINT'3;Height;" ":AT'3;0,26:PRINT'3;K;" "
2440 IF Height<0 THEN End_Of_Game:GO TO 1490
2450 IF Height=0&&BaseAddress=ShipAddress THEN
2460   IF Ro%<>0 THEN End_Of_Game:GO TO 1490
2470   Extra%=3000-INT (Vspeed*100)-ABS (INT (Hspeed*100))-INT (K)*
100-ABS (Thrust)*100
2480   Score=Score+Extra%
2490   IF Score<0 THEN Score=0
2500   IF Extra%<0 THEN
2510     INK 7:FILL 1:CIRCLE Horiz,Hship,10:FILL 0
2520     PRINT'3;"Well Done you created a ";ABS (Extra%*1.4);" km
wide crater"
2530     PRINT'4;"Landing Speed TOO HIGH. You have lost ";ABS (Ex
tra%);" credits"
2540     Fuel%=Fuel%/2
2550   ELSE
2560     INK 7:POINT Horiz,Hship:TURNT0 90:MOVE 15:TURN 45
2570     MOVE 5:TURN 45:MOVE 3:TURN 90:MOVE 5:TURN 60:MOVE 8
2580     PRINT'3;"Well Done you scored ";Extra%;" pts for that ";
2590     SELECT ON Vspeed
2600       =-20 TO 0:PRINT'3;"perfect landing"
2610       =1 TO 4:PRINT'3;"bumpy landing"
2620       =5 TO 9:PRINT'3;"heavy landing"
2630       =10 TO 14:PRINT'3;"rough landing"
2640       =REMAINDER :PRINT'3;"incredible landing"
2650     END SELECT
2660     Fuel%=Fuel%+Extra%/5
2670     PRINT'4;"Plus a fuel bonus of ";Extra%/5
2680   END IF
2690   FOR I=0 TO 100:BEEP 5000,I+100:BORDER RND (5),I
2700   BORDER 0:Intro2:IF Fuel%<=0 THEN HIGHEST:RUN
2710   Initialise
2720 END IF
2730 INK 0:POINT OldX,OldY:TURNT0 OldDeg:MOVE 5:TURN 135
2740 MOVE 7:TURN 90:MOVE 7:TURN 135:MOVE 7:TURN -45:MOVE 2
2750 TURN -135:MOVE 7:TURN -135:MOVE 2

```



```

2760 IF Th<>0:TURN -110-Th/1.1:MOVE Th:TURN 130+Th*1.8:MOVE Th
2770 END REPEAT Game
2780 END DEFINE
2790 DEFINE PROCEDURE Title
2800 OPEN'5;con_480x240a20x15:MODE 8:CSIZE'5;3,1:OVER'5;1
2810 FOR I=1,3:CURSOR'5;I,I+1:INK'5;I+4:PRINT'5;"StarCruiser"
2820 CSIZE'5;0,0
2830 END DEFINE
2840 DEFINE PROCEDURE Spaceship
2850 J=0:FOR I=0,6,2:INK'5;I:FILL'5;1:J=J+1:CIRCLE'5;90+J*3,50,50
2860 FILL'5;0:INK'5;7:PENDOWN'5:POINT'5;30,60
2870 TURNTO'5;50:MOVE'5;20:TURN'5;-90:MOVE'5;10:TURN'5;-90:MOVE'5;20
2880 TURN'5;-90:MOVE'5;10:TURN'5;155:MOVE'5;30:TURN'5;170:MOVE'5;21
2890 TURN'5;-55:MOVE'5;21:TURN'5;-55:MOVE'5;20:TURN'5;168:MOVE'5;29
2900 TURN'5;-63:MOVE'5;5:TURN'5;90:MOVE'5;5:TURN'5;90:MOVE'5;10
2910 TURN'5;-50:MOVE'5;6:TURN'5;-45:MOVE'5;10:TURN'5;90:MOVE'5;5
2920 TURN'5;90:MOVE'5;6
2930 PENUP'5:TURN'5;90:MOVE'5;5:PENDOWN'5
2940 MOVE'5;5:TURN'5;-45:MOVE'5;5:TURN'5;-45:MOVE'5;5
2950 PENUP'5:TURN'5;-53:MOVE'5;13:PENDOWN'5
2960 TURN'5;53:MOVE'5;8:TURN'5;-90:MOVE'5;4:TURN'5;-45:MOVE'5;15
2970 TURN'5;-45:MOVE'5;4:TURN'5;-90:MOVE'5;8
2980 PENUP'5:TURN'5;-45:MOVE'5;6:PENDOWN'5:TURN'5;-45:MOVE'5;6
2990 PENUP'5:TURN'5;194:MOVE'5;8:PENDOWN'5:TURN'5;75:MOVE'5;6
3000 INK'5;3:TURN'5;65:MOVE'5;20:TURN'5;150:MOVE'5;20
3010 END DEFINE
3020 DEFINE PROCEDURE Intro2
3030 SELECT ON Score
3040 =0 TO 3000:Acc=2:Ra=0:S$="Space Cadet"
3050 =3001 TO 6000:Acc=4:Ra=1:S$="Space Captain"
3060 =6001 TO 9000:Acc=8:Ra=2:S$="Space Colonel"
3070 =9001 TO 12000:Acc=12:Ra=3:S$="Space General"
3080 =REMAINDER :Acc=16:Ra=4:S$="Space Commander"
3090 END SELECT
3100 END DEFINE
3110 DEFINE PROCEDURE Intro
3120 Title:AT'5;3,0
3130 PRINT'5;"The once proud Xuthilian Empire fleet lies in ruins,
devastated by an alien force of immense power. ";
3140 PRINT'5;"The Empire has therefore been forced to recruit space
pilots from the far reaches of the galaxy. You join ";
3150 PRINT'5;"as a 'Space Cadet' and gain promotion through the
ranks by successful landing your Starcruiser."
3160 FOR I=3,1
3170 IF I=1 THEN INK'5;7:ELSE INK'5;5
3180 CURSOR'5;130,130+I:PRINT'5;"Captain > 3000 Credits"
3190 CURSOR'5;130-I,150+I:PRINT'5;"Colonel > 6000 Credits"
3200 CURSOR'5;130+I,170+I:PRINT'5;"General > 9000 Credits"
3210 CURSOR'5;130,190-I:PRINT'5;"Commander > 12000 Credits"
3220 END FOR I
3230 A$=INKEY$(1000):Title:Spaceship
3240 INK'5;6:AT'5;6,19:PRINT'5;" Reduce Thrust"
3250 AT'5;8,19:PRINT'5;" Increase Thrust"
3260 AT'5;10,19:PRINT'5;" Rotate Left"
3270 AT'5;12,19:PRINT'5;" Rotate Right"
3280 AT'5;14,19:PRINT'5;"<space> Abort"
3290 INK'5;3:UNDER'5;1:AT'5;4,19:PRINT'5;"Control Keys":UNDER'5;0
3300 A$=INKEY$(1000):CLOSE'5
3310 END DEFINE
3320 DEFINE PROCEDURE Landing
3330 UNDER 1:INK 7:AT 2,23:PRINT"Landing Information":UNDER 0
3340 Intro2:AT 6,15:PRINT"Ranking";TO 49:S$
3345 AT 8,15:PRINT"Name";TO 49:M$
3350 AT 10,15:PRINT"Credits allocated";TO 49:Score
3360 AT 12,15:PRINT"Gravitational Pull";TO 49:Acc
3370 AT 14,15:PRINT"Fuel";TO 49:Fuel%:INK 2
3380 AT 18,13:PRINT"The Xuthilian Empire Needs Space Commanders"
3400 PAPER 0:A$=INKEY$(300)
3410 END DEFINE
3420 DEFINE PROCEDURE End_Of_Game
3430 FOR I=1 TO 10:INK 7:CIRCLE Horiz,Hship,I:BEEP 300,I
3440 FOR I=0 TO 9:SCROLL'3;-1:SCROLL'4;1:BEEP 30,4
3450 Fuel%=Fuel%/2:IF Fuel%<=0 THEN HIGHEST:RUN

```

```

3460 Initialise
3470 END DEFINE
3480 DEFINE PROCEDURE Display (Address,Distance)
3490 LOCAL start
3500 CLS:start=Address
3510 FOR I=1 TO Distance
3520 IF start>Ba+191 THEN start=Ba
3530 INK 7:LINE (I-1)*10,PEEK(start) TO I*10,PEEK(start+1)
3540 IF BaseAddress=start:INK 2:FILL 1:ARC (I-1)*10,PEEK(start) TO
(I-1)*10+10,PEEK(start),PI:FILL 0
3550 start=start+1
3560 END FOR I
3570 END DEFINE
3580 DEFINE PROCEDURE Terrain
3590 LOCAL Store,Points,A,Base,Land
3600 Store=100:Base=0:Land=RND(1 TO 59):RESTORE 3710
3610 FOR Points=0 TO 192
3620 READ A
3630 IF Points>0 THEN Platform=Store:ELSE Platform=0
3640 Store=Store+A
3650 POKE (Ba+Points),Store
3660 IF Platform=Store THEN
3670 Base=Base+1
3680 IF Land=Base THEN BaseAddress=Ba-1+Points
3690 END IF
3700 END FOR Points
3710 DATA 0,-20,-40,4,-24,0,0,24,56,-36,0,0,-16,-8,0,8,28,-16,8
3720 DATA -8,-20,20,0,-12,12,0,0,-20,-20,-20,0,0,40,36,-20,-16
3730 DATA 32,28,0,0,-100,0,0,60,8,-8,8,-8,16,24,0
3740 DATA -80,40,0,0,-40,0,0,0,28,12,10,10,8,8,4,-4,-4,-8,4
3750 DATA 4,-8,-4,-60,0,72,-12,16,-16,-20,20,0,0,-20,0,-4,-12
3760 DATA -24,0,-4,4,-4,4,20,28,28,-16,0,-20,20,20
3770 DATA 0,-80,0,40,-8,-20,-12,20,-20,0,0,0,40,20,10,0,-10,-20
3780 DATA -20,0,60,-60,0,0,0,0,0,60,-60,0,20,20,10,0,0
3790 DATA -10,10,10,-20,0,0,20,0,-20,-20,4,36,0,0,-36,-4,8,32
3800 DATA -5,8,4,0,10,-10,2,3,-20,-20,4,0,0,0,-36,-4,8,32
3810 DATA 0,20,0,-20,-10,5,3,2,0,0,-1,-3,-5,0,0,0,5,3,0,25
3820 END DEFINE
3830 DEFINE PROCEDURE HighscoreTable
3840 OPEN '6;con_512x256a0x0:PAPER'6;4:INK'6;0:CLS'6:BORDER'6;5
3850 PAPER'6;2
3860 AT'6;0,25:PRINT'6;"StarCruiser Top TEN scores"
3870 PAPER'6;4
3880 AT'6;2,10:PRINT'6;"Rank";TO 30;"Name";TO 50;"Score";TO 64;"Time"
3890 FOR I=1 TO 10
3900 Score=sc$(I,1):Intro2:AT'6;2+I*2,4:PRINT'6;I;". ";TO 10;S#;
3910 PRINT'6;TO 30;sc$(I,2);TO 50;sc$(I,1);TO 64;sc$(I,3)
3920 END FOR I
3930 A$=INKEY$(1000):CLOSE'6
3940 END DEFINE
3950 DEFINE PROCEDURE HIGHTEST
3960 rank=1
3970 REPEAT pos
3980 IF rank=11 THEN EXIT pos
3990 Tu=Ta$(13 TO 14)*3600+Ta$(16 TO 17)*60+Ta$(19 TO 20)
4000 Ti=sc$(rank,3,1 TO 2)*3600+sc$(rank,3,4 TO 5)*60+sc$(rank,3,7
TO 8)
4010 IF Ti>Tu&&Score=sc$(rank,1)::Score>sc$(rank,1):EXIT pos
4020 rank=rank+1
4030 END REPEAT pos
4040 IF rank<>11 THEN
4050 FOR I=10 TO rank+1 STEP -1
4060 sc$(I,1)=sc$(I-1,1):sc$(I,2)=sc$(I-1,2)
4070 sc$(I,3)=sc$(I-1,3)
4080 END FOR I
4090 sc$(rank,1)=Score:sc$(rank,2)=M#
4100 sc$(rank,3)=Ta$(13 TO 20)
4110 END IF
4120 DELETE mdv1_Highscore_StarCruiser
4130 OPEN_NEW'6;mdv1_Highscore_StarCruiser
4140 FOR I=1 TO 10:PRINT'6;sc$(I,1)\sc$(I,2)\sc$(I,3)
4150 CLOSE '6
4160 END DEFINE

```

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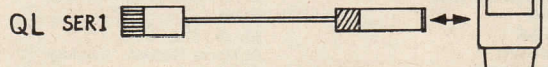
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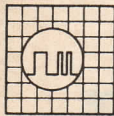
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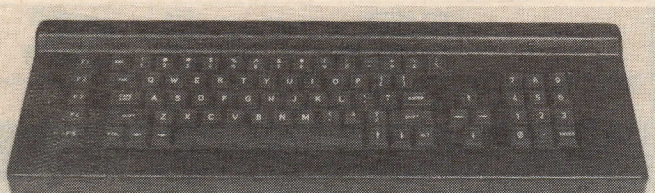
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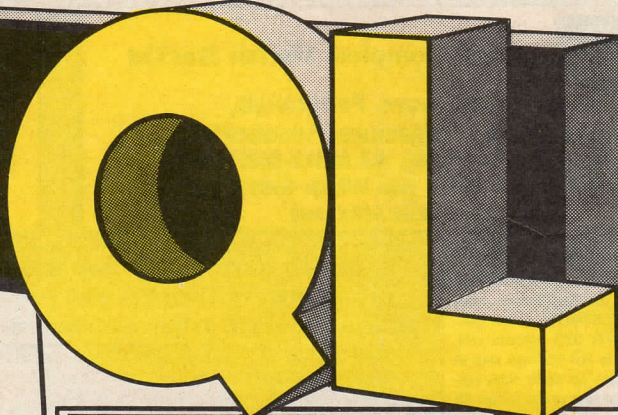
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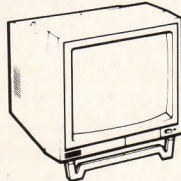
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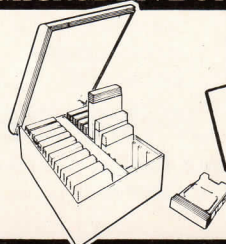
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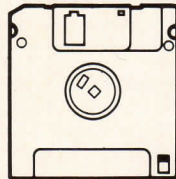
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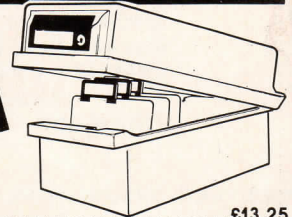
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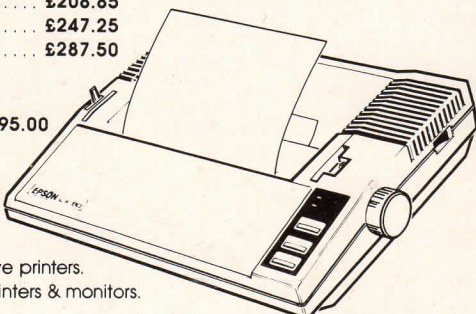
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